ZEISS

West Germany

Carl Zeiss
D-7082 Oberkochen

Operation microscopes Opmi 6

Operating instructions

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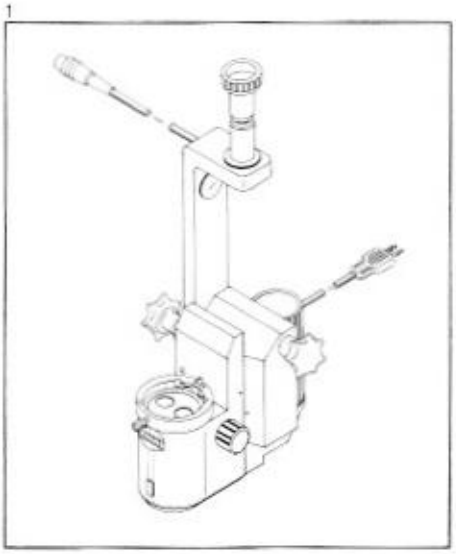
Do not use these instruments near hazardous locations.

Repair and maintenance of electro-medical instruments must be effected by the manufacturer or expressly authorized representatives.

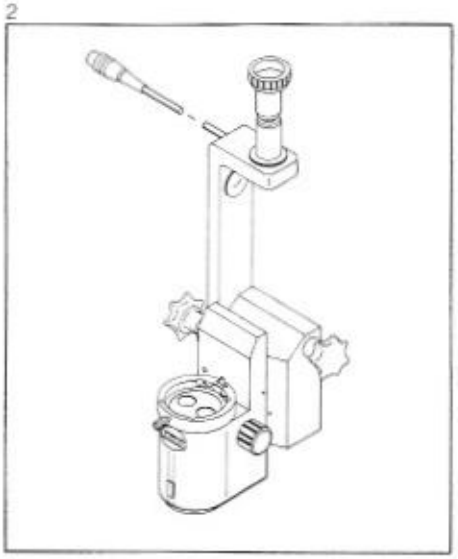
1



Three versions of the Opmi 6 operation microscope are available, differing in their illumination systems.

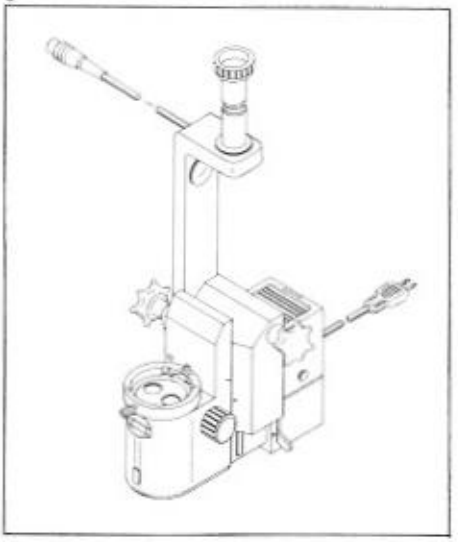
Opmi 6 S operation microscope
"Filament lamp illumination"
Cat. No. 30 34 60

2



Opmi 6 SF operation microscope
"Fiber illumination"
Cat. No. 30 34 58

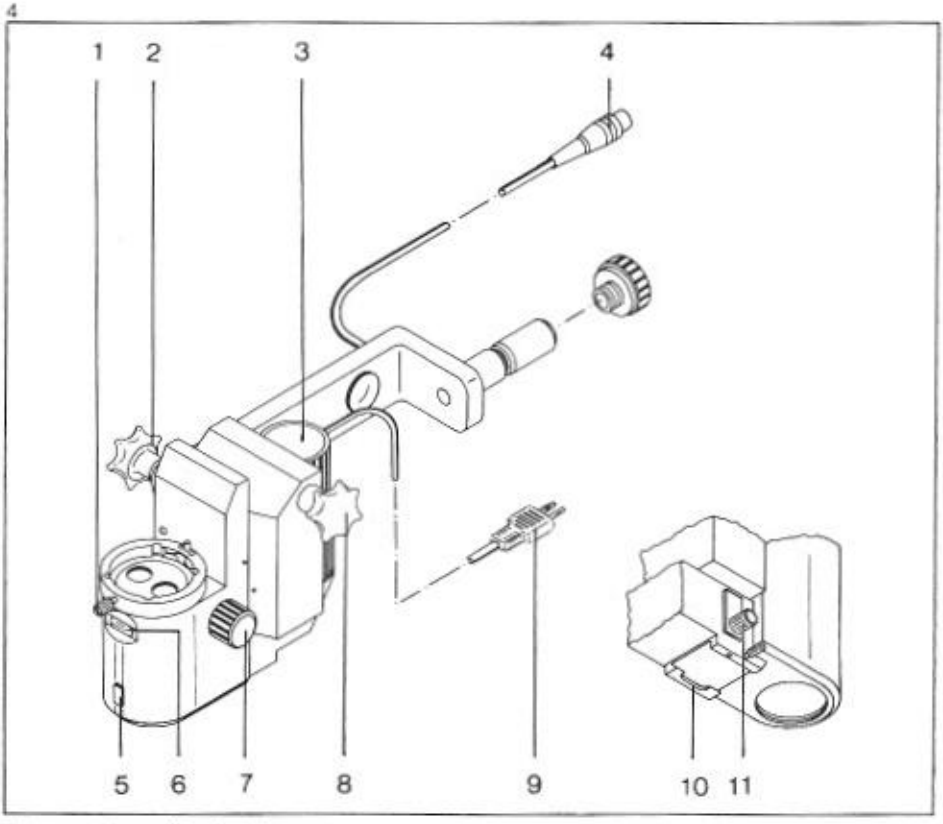
3



Opmi 6 SH operation microscope
"Halogen lamp illumination"
Cat. No. 30 34 59

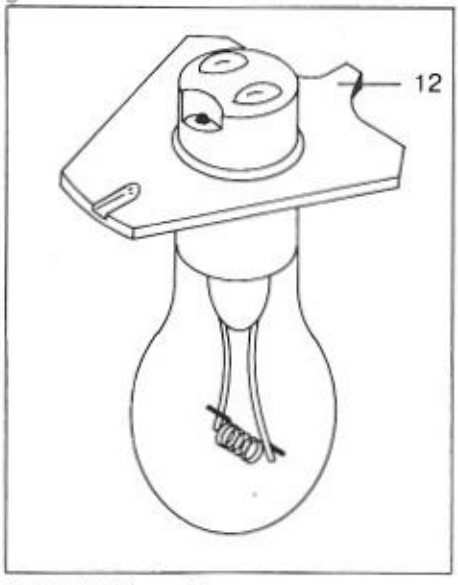
Microscopes

4



Filament lamp illumination

5



6 V 30 W filament lamp

Filament lamp illumination
The filament lamp illumination is the standard version of the three illumination systems available (approx. 50,000 lux at the operating field at a working distance of 200 mm). Illuminated field diameter is approx. 32 mm. For stronger illumination the microscope can be retrofitted with fiber illumination (see pp. 64–66).

Clamp screw (1) locks binocular tubes and/or beam splitter introduced into dovetail mount of the microscope.

Star knob (2) locks or releases the tilting motion of the microscope. With clamping locked the microscope can still be tilted by turning star knob (8).

Lamp cap (3) is removed by slightly pressing it down and turning counter-clockwise. Now the lamp can be exchanged.

Plug (4) is for power supply of motorized zoom and focusing system. Knob (7) is for manual zoom adjustment. The zoom magnification factors are from 0.5 to 2.0 and displayed in indicator (6).

A handle *(30 34 47* or *30 34 48)* can be attached with cap (5) removed.

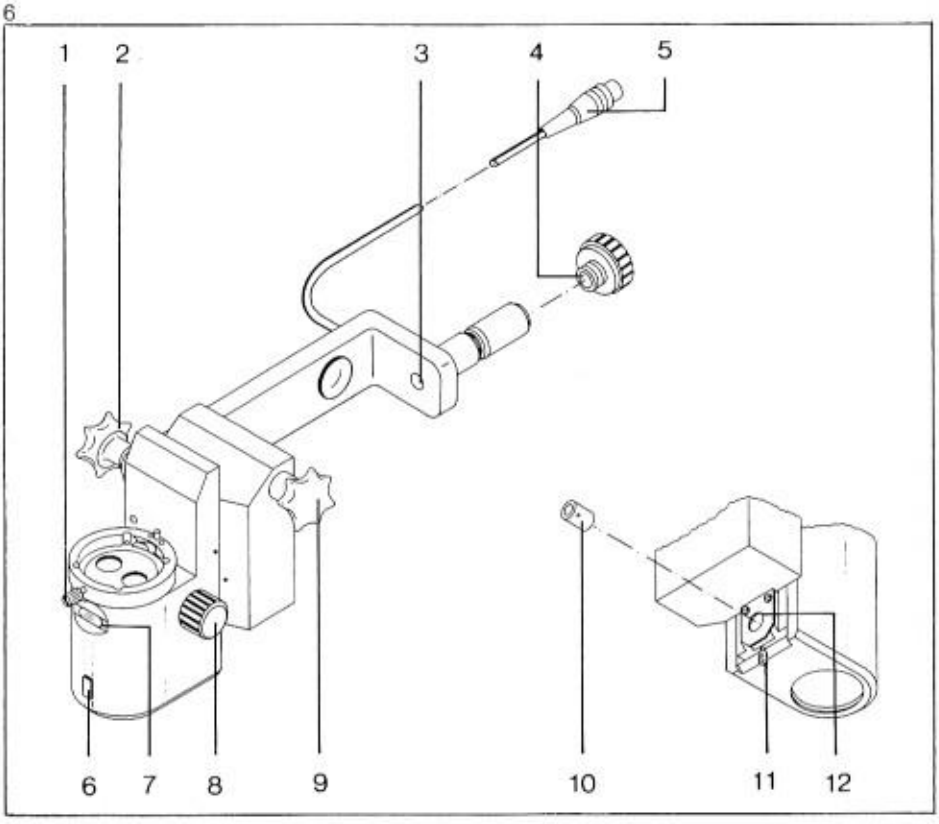
Low voltage plug (9) connects the microscope illumination to the power supply.

Dovetail guide (10) takes accessories, e.g., electronic flash *(30 81 08)* for photographic work.

Turning knob (11) switches the green filter into the beam path.
Cat. No. 30 34 60.

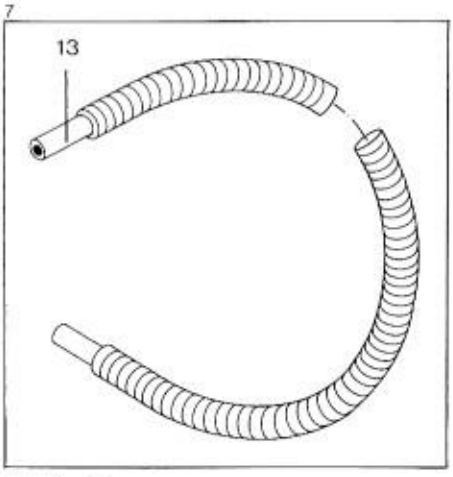
6 V 30 W filament lamp
When exchanging the lamp, nose (12) of centering mount must be between the two lampholder pins.
Ca. No. 390158

6



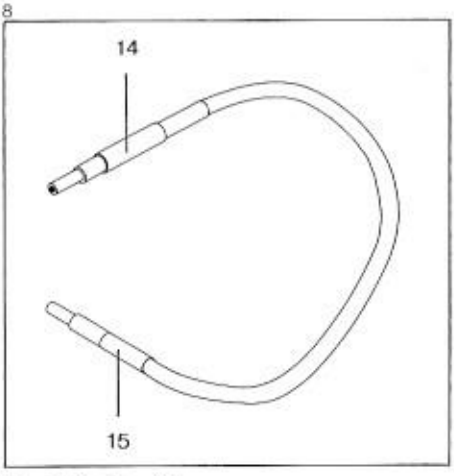
Fiber illumination

7



Light guide

8



Liquid light guide

Fiber illumination
The brightness of microscopes with fiber illumination (approx. 100,000 lux at the operating field at a working distance of 200 mm) is higher than with filament lamp illumination. The illuminated field diameter is variable from 60 to 80 mm. Thanks to the fiber optics heating up of the microscope and the operating field is kept at a minimum, even during prolonged periods of use.

Clamp screw (1) locks binocular tubes or beam splitter introduced into dovetail mount of the microscope.

Star knob (2) locks or releases the microscope's tilting motion. With clamping locked the microscopes can be tilted by turning knob (9).

For illumination, lead light guide from power supply unit through holes (4) and (3), introduce into jack (10) and secure with grub screw of jack (10). Now introduce ligh guide with jack (10) into hole (12) until illuminated field has the diameter desired. With screw (11) clamp light guide with jack in hole (12).

Plug (5) connects to power supply for motorized zoom and focusing system. Knob (8) is for manual zoom adjustment. The zoom magnification factors are from 0.5 to 2.0 and displayed in indicator (7).

A handle *(30 34 47* or *30 34 48)* can be attached with cap (6) removed.
Cat. N. 30 34 58

Light guide
The light guide (13) is flexible and either end can be connected to microscope or power supply unit

	Cat. No.
1.2 m light guide	*30 34 81–8002*
1.5 m light guide	*30 34 81–8005*
1.8 m light guide	*30 34 81–8001*
2.0 m light guide	*30 34 81–8003*
2.2 m light guide	*30 34 81–8004*
2.5 m light guide	*30 34 81–8006*

Liquid light guide:
A liquid light guide can also be used instead of the fiber optics light guide.

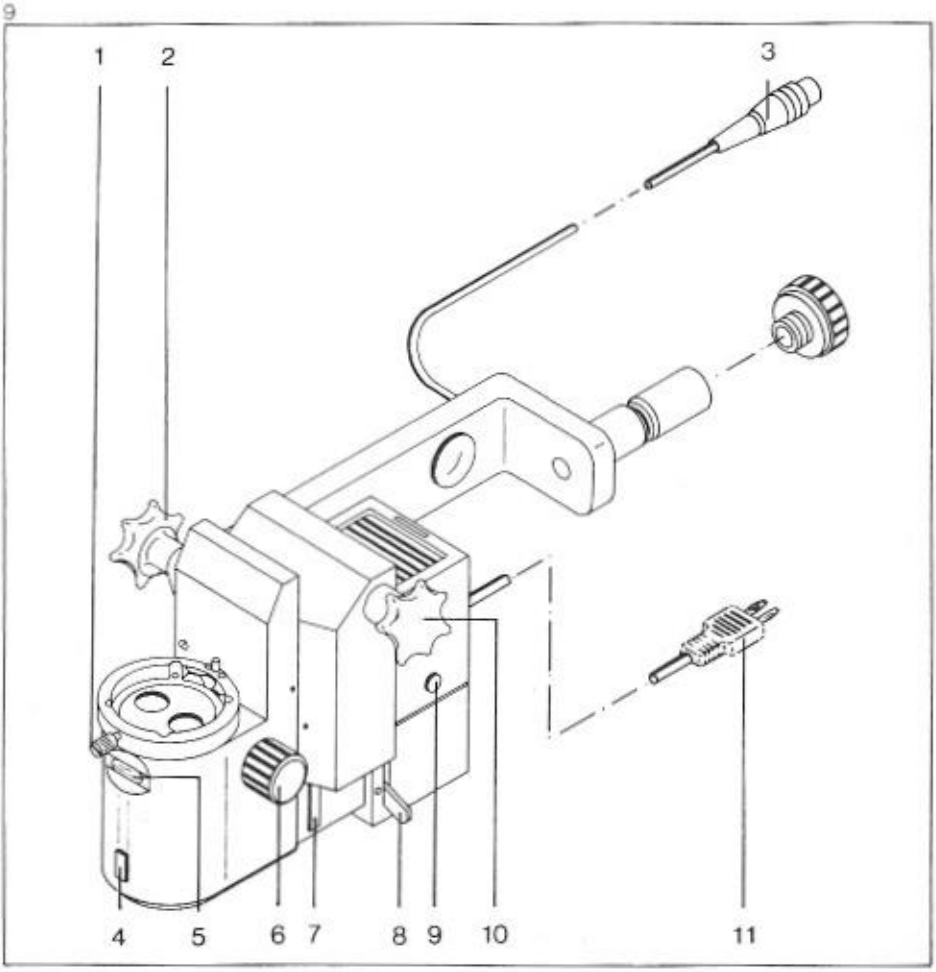
When connecting the liquid light guide the following must be observed:

End (14) with black reinforced plastic collar must be connected to power supply unit.

End (15) with continuous metal sleeve must be connected to operation microscope.

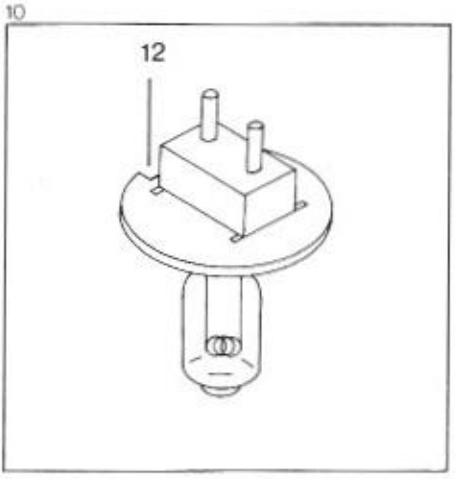
	Cat. No.
1.2 m liquid light guide	*30 34 81–8052*
1.8 m liquid light guide	*30 34 81–8051*

9



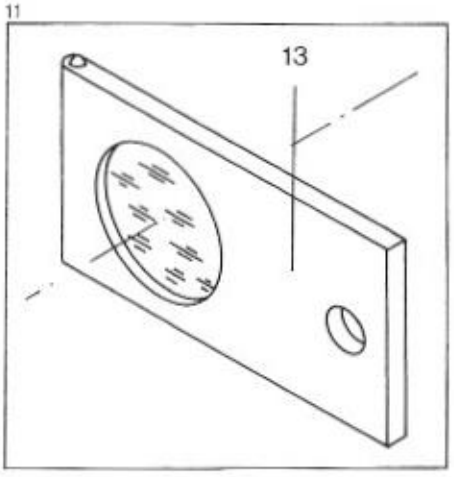
Halogen lamp illumination

10



Halogen lamp

11



Filter slide

Halogen lamp illumination
The halogen lamp illumination is the strongest of the three illumination systems offered (approx. 230,000 lux at the operating field at a working distance of 200 mm). The illuminated field diameter is 40 mm and can be continuously reduced to 50% by iris diaphragm (8). Halogen lamp illuminations are mainly used for photo, cine and TV work.

Clamp screw (1) locks binocular tubes or beam splitter introduced into dovetail mount of the microscope.

Star knob (2) locks or releases the tilting motion of the microscope. With clamping locked the microscope can be tilted by turning knob (10).

Plug (3) connects to the power supply for motorized zoom and focusing system. Knob (6) is for manual zoom adjustment. The zoom magnification factors are from 0.5 to 2.0 and displayed in indicator (5).

A handle *(30 34 47* or *30 34 48)* can be attached with cap (4) removed.

With cap (7) removed different filter slides can be inserted.

Press the two knobs (9) to remove lamp housing for lamp exchange. With lamp housing removed, the halogen lamp becomes accessible. Slightly press down the white knob of the retaining clip and turn by 90°. Now the lamp is released and can be exchanged. (Handling is also illustrated on a sticker that becomes visible on removing the lamp housing).

Low-voltage plug (11) connects to power supply for the microscope illumination *Cat. No. 30 34 59*

12 V 100 W halogen lamp
Recess (12) provides correct centering of the introduced halogen lamp.
(PHILIPS: Type 6839 C,
Cat. No. 050.4219)
Cat. No. 38 0075–1020

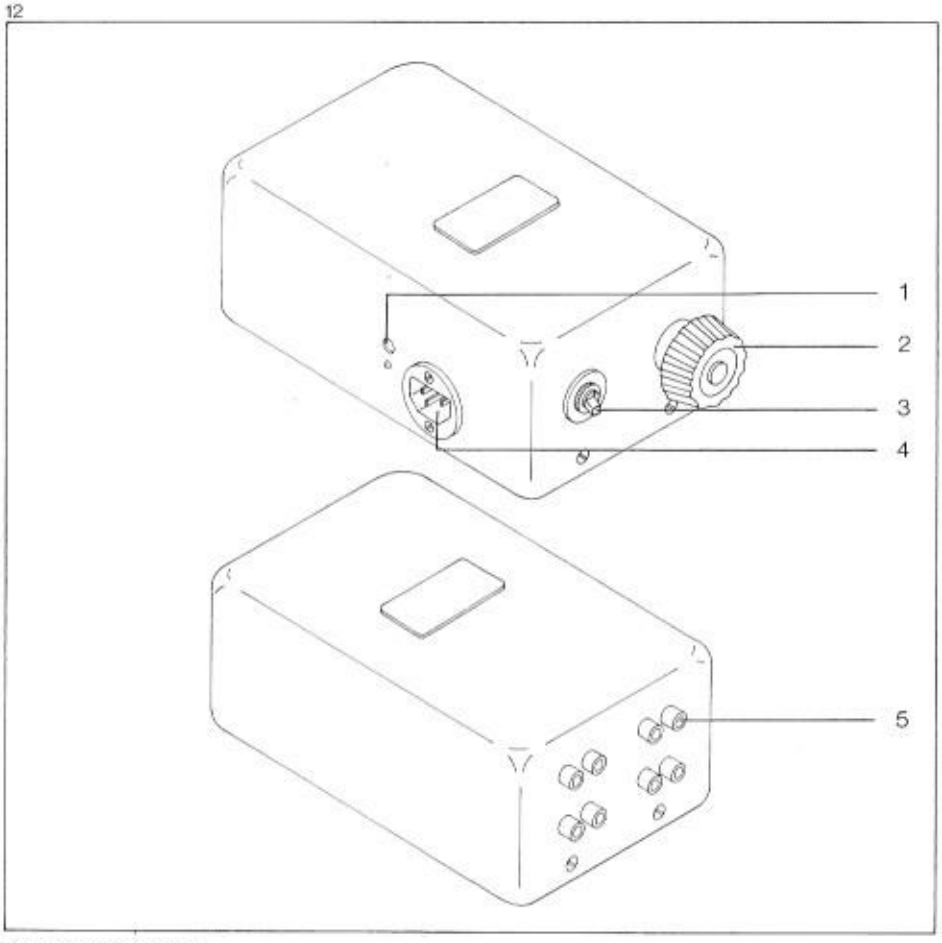
Filter slide
The microscope has two filter locking positions:
Locking position 1: Filter completely inserted, observation with filter.
Locking position 2: Filter halfway inserted, observation without filter

The following filter slides are available for the Opmi 6 SH operation microscope:

	Cat. No.
Filter slide with green filter	*30 34 70–8009*
Filter slide with blue filter	*30 34 70–8025*
Filter slide with exciter filter	*30 34 70–8026*

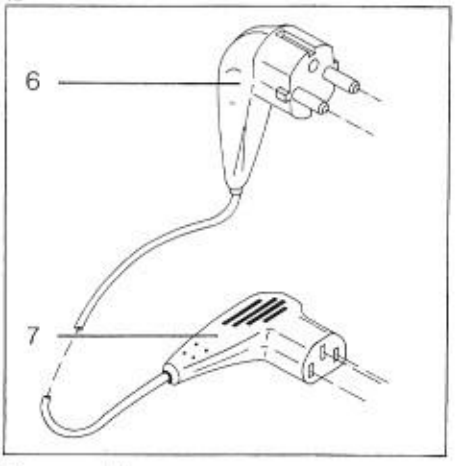
Power supply units

12



Power supply unit

13



Power cable

Power supply unit for filament lamp illumination

Power supply unit

- The power supply unit is required for microscope stands without built-in power supply unit (e.g., table stand).
- First of all check whether voltage display (1) agrees with mains voltage. If not, it must be adjusted by our service technicians.
- The microscope plug can be inserted in one of the three pairs of black jacks (5). The pair of red jacks can be used for overload circuitry (8.5 V).
- Outlet (4) takes the power cable.
- Switch (3) turns power supply unit on/off.
- Regulator (2) continuously adjusts the brightness of the microscope filament lamp.

Specifications:

Cat. No.	*309939-9901*
Length:	185 mm
Width:	110 mm
Height:	75 mm
Weight:	2.320 kg

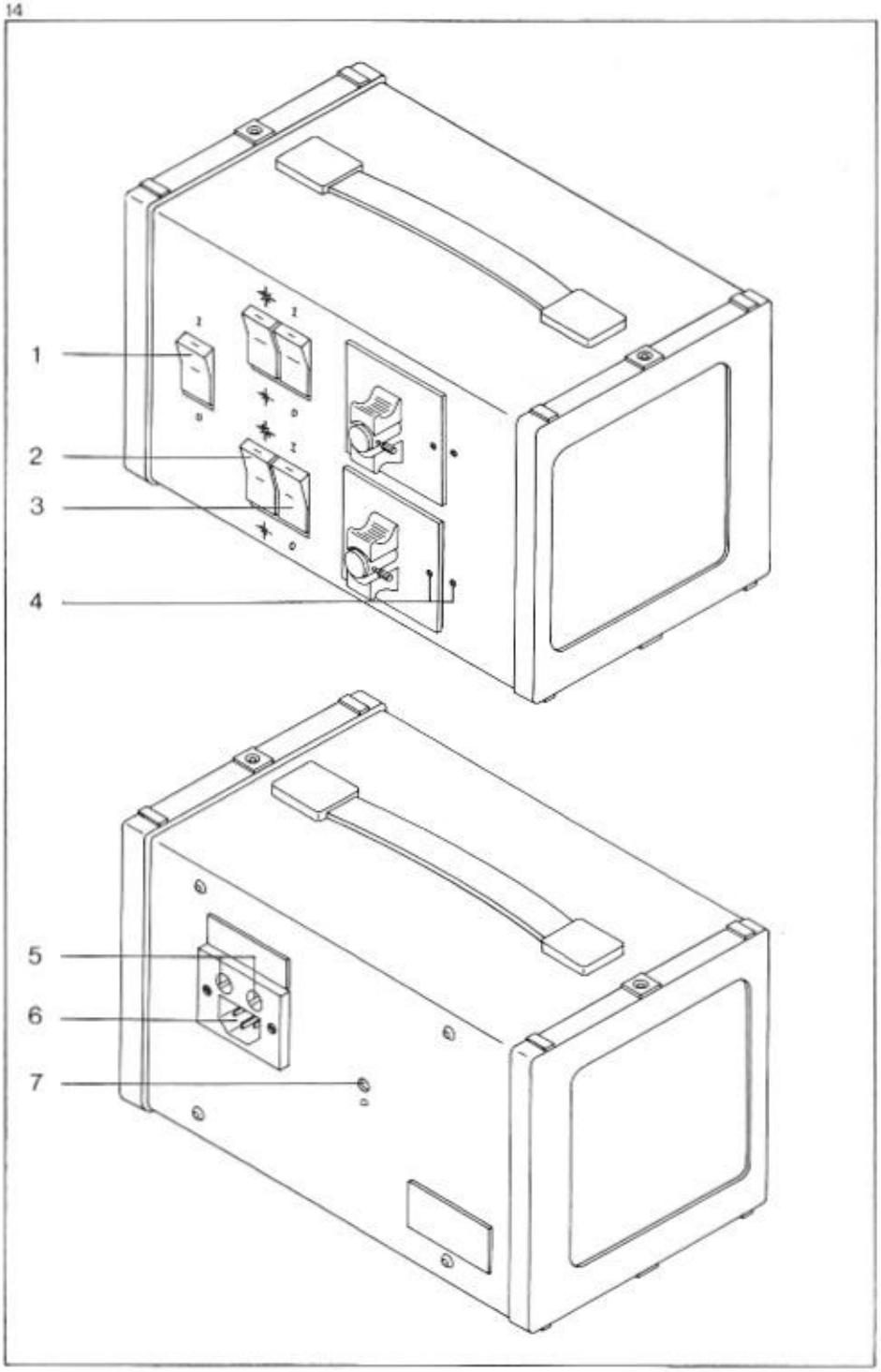
Voltages:
100-110-120-127-220-240 V
Mains frequency: 50...60 Hz (cps)
Power input: 50 VA

Power cable:

- Standard CEE plug (7) connects to power supply unit
- Safety plug (6) connects to mains.

	Cat. No.
2 m power cable	*380071-2810*
6 m power cable	*380071-2830*

14



Power supply unit

Power supply unit for fiber illumination

Power supply unit

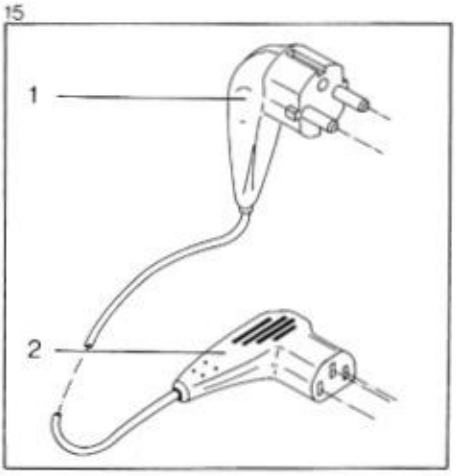
- First of all check whether voltage display (7) agrees with mains voltage. If not, it must be adjusted by our service technicians. When adjusting, the fuse links might have to be exchanged.
- The power cable connects wall socket to standard CEE plug (6) of power supply unit.
- Main switch (1) turns both power supply unit and fan of lamp cooling system on and off.
- Switches (3) turn on their corresponding fiber illumination systems at the top and the bottom.
- Switches (2) adjust brightness of each lamp holder.
  Bright symbol – nominal voltage
  Weak symbol – undervoltage
- To ensure circulation of cooling air, dots (4) of housing and lamp holder must be adjacent.
- With removal of two caps (5) the fuses (identical values) become accessible:
  Values:
  100-127 V T 4 Amp. 250 V
  Cat. No. 380018–0720
  220-240 V T 2 Amp. 250 V
  Cat. No. 380018–0730

Specifications:

Cat. No.	*303479*
Length:	225 mm
Width:	145 mm
Height:	150 mm
Weight:	10 kg

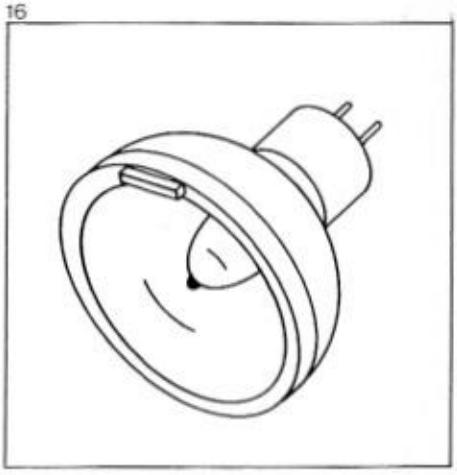
Voltages:
100-110-120-127-220-240 V
Mains frequency: 50…60 Hz cps
Power input: 250 VA

15



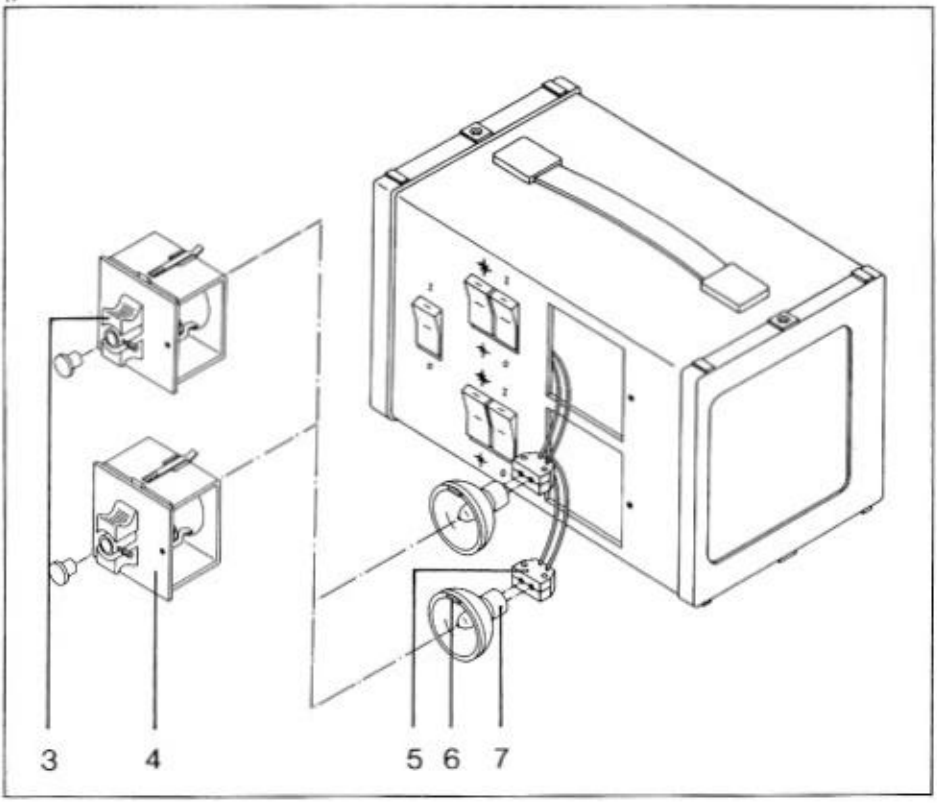
Power cable

16



Reflector

17



Changing the lamps of the power supply unit

Power cable

- Safety plug (1) connects to mains.
- Standard CEE plug (2) connects to the power supply unit.

	Cat. No.
2 m power cable	*380071–2810*
6 m power cable	*380071–2830*

Reflector:

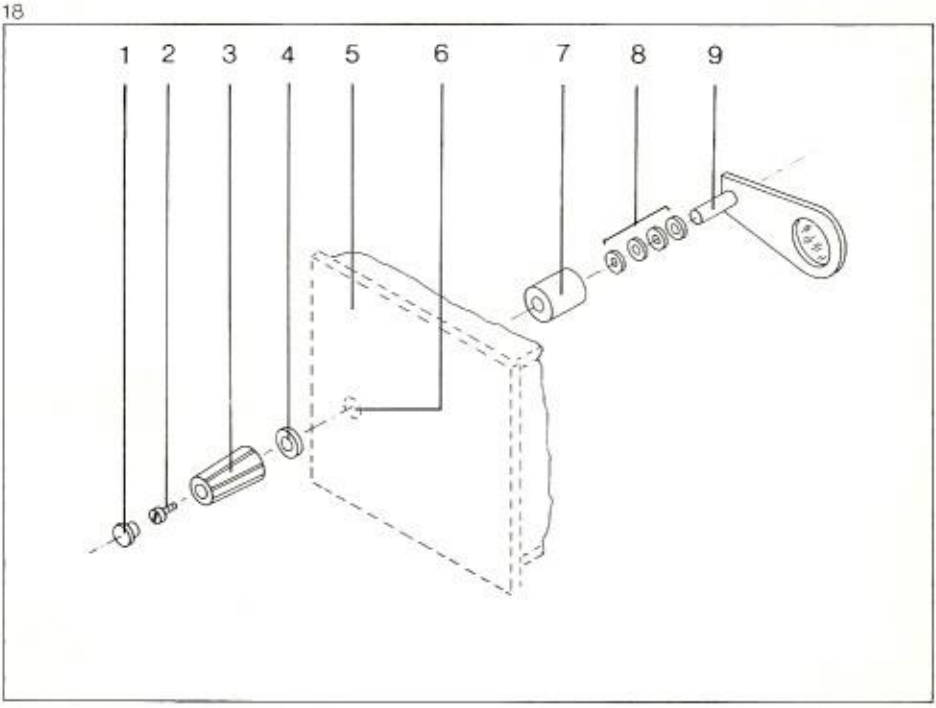
- The power supply unit is equipped with a 12 V 100 W reflector (e.g., OSRAM 64627 or PHILIPS 6834).

	Cat. No.
12 V 100 W reflector	*380079–9040*

Changing the lamps of the power supply unit

- Caution: Before removing lamps switch off instrument and let lamps cool down.
- Press two interlocks (3) together for removing the two lamp holders (4) from the power supply unit.
- Remove reflectors (7) from lamp holders by pulling them out gently.
- Do not pull cable for removing reflectors (7) from lamp sockets (5), but hold socket and pull out reflector.
- When introducing new reflectors catch (6) must engage in the recess provided.

18



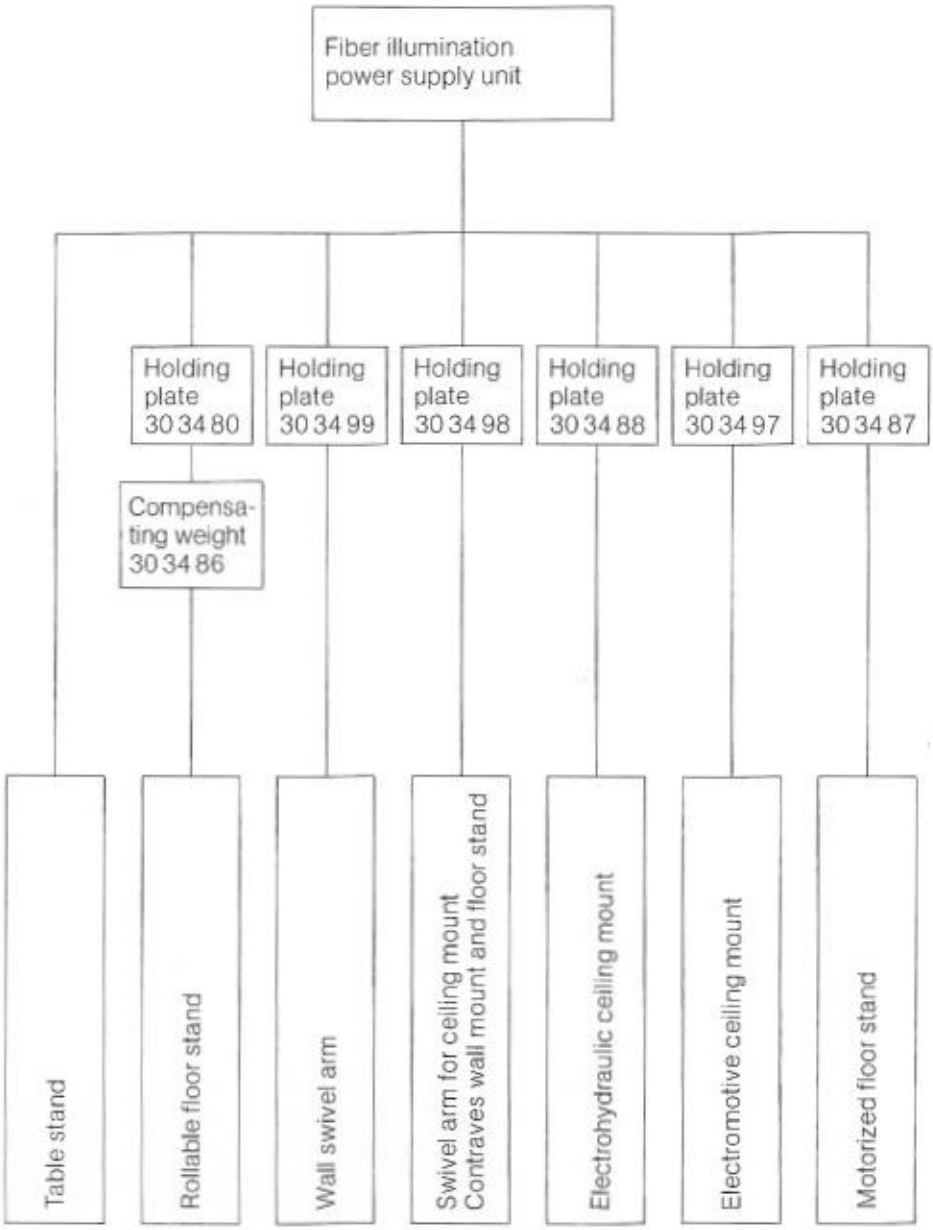
Mounting the green filter

Mounting the green filter
Lamp holder (5) can be delivered with green filter *30 34 85* already mounted. The green filter can also be mounted later as follows:

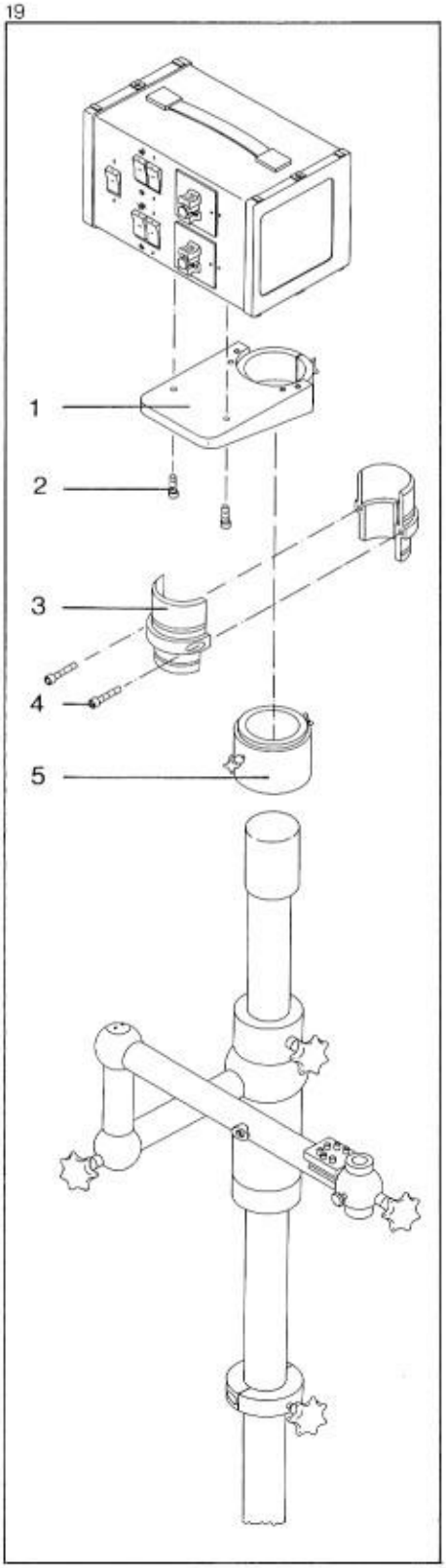
- Remove protective cap from hole (6).
- Slide the four lock washers (8) and spacer (7) onto bolt (9) of green filter and pass through hole (6) of holder.
- Slide washer (4) onto bolt (9) and tighten knob (3) with screw (2). Press protective cap (1) into knob hole after mounting.

Mounting on various stands/mounts

- The fiber illumination power supply unit can be attached to all stands/mounts of our sales program.
- Different holding plates are required for attachment.


Fiber illumination power supply unit
Holding plate 30 34 80
Holding plate 30 34 99
Holding plate 30 34 98
Holding plate 30 34 88
Holding plate 30 34 97
Holding plate 30 34 87
Compensating weight 30 34 86
Table stand
Rollable floor stand
Wall swivel arm
Swivel arm for ceiling mount
Contraves wall mount and floor stand
Electrohydraulic ceiling mount
Electromotive ceiling mount
Motorized floor stand

19

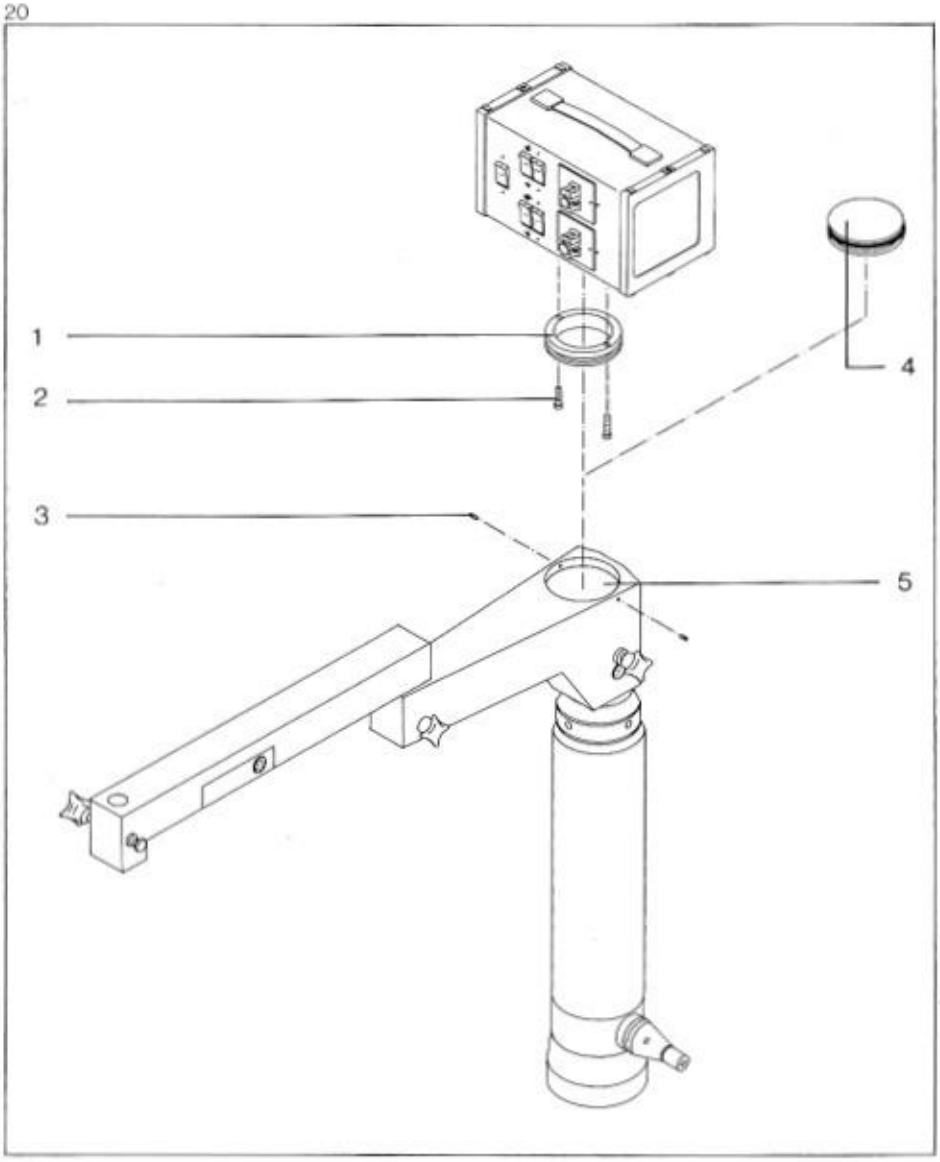


Mounting of power supply unit
on floor stand

Mounting of power supply unit on floor stand

- Slide compensating weight (5) over stand column and lock to two holders when mounted.
- Lock the two holders (3) with the two screws (4) to stand column. Clamping heigh should not affect the working range of the stand carrier. The Perlon tape of the stand must move freely in the groove of one holder.
- Attach holding plate (1) to power supply unit with the two screws (2).
- Slide power supply unit with holding plate over stand column until it rests on the two holders screwed together and lock in place.

20

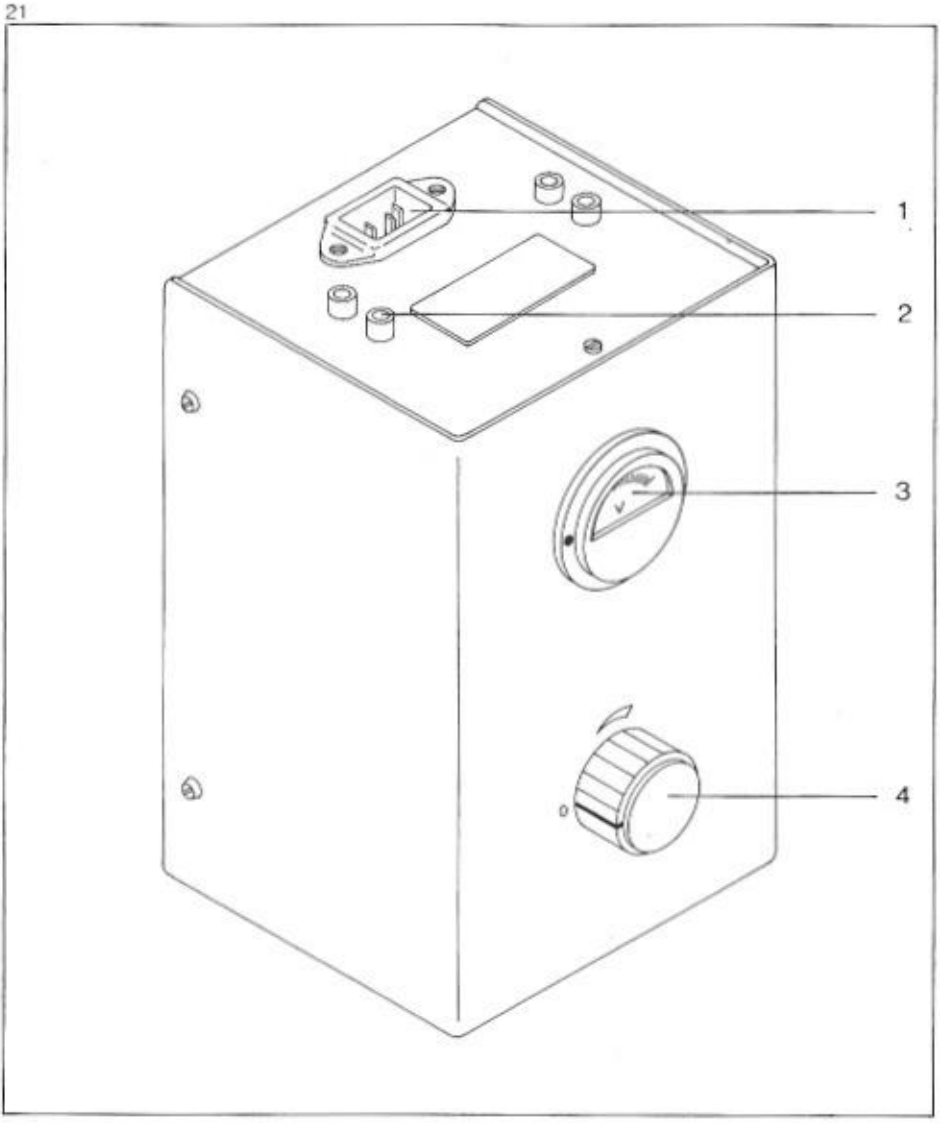


Mounting on motorized stand

Mounting on upper part of motorized stand with manual rack-and-pinion adjustment

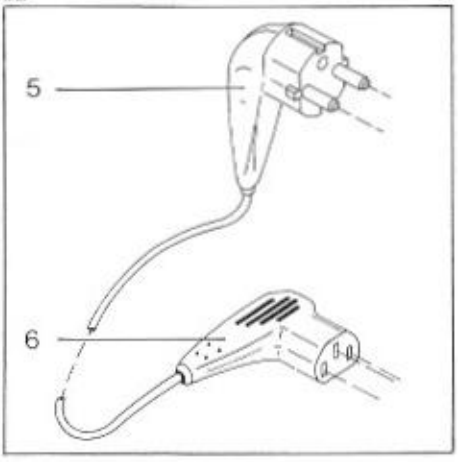
- Screw ring (1) with the two screws (2) on power supply unit with the thicker rim uppermost to power supply unit.
- Remove two screws (3) and take off lid (4).
- Introduce power supply unit with ring into hole (5). Screw in two screws (3) until ring is clamped and power supply unit does not fall out.
- Mounting to the upper part of motorized stand without manual rack-and-pinion adjustment is the same.

21



Power supply unit

22



Power cable

Power supply unit for halogen lamp illumination

Power supply unit

- The power supply unit is required for microscope stands without built-in power supply unit.
- The voltage set is indicated on the rear of the power supply unit.

Should the voltage set not correspond to that of mains, it must be adjusted by our service technicians.

- Outlet (1) takes the power cable.
- The microscope plug can be inserted in one of the two pairs of black jacks (2).
- Regulator (4) continuously adjusts the lamp voltage from 3 V to 13 V.
- The lamp voltage is indicated on voltmeter (3). If possible, it should not exceed 12 V, otherwise the service life of the lamp will be greatly reduced.
- The power supply unit can be used either upright or lying down.

Specifications:

Cat. No.	*309608*
Lenght:	130 mm
Width:	120 mm
Height:	210 mm
Weight:	5.6 kg

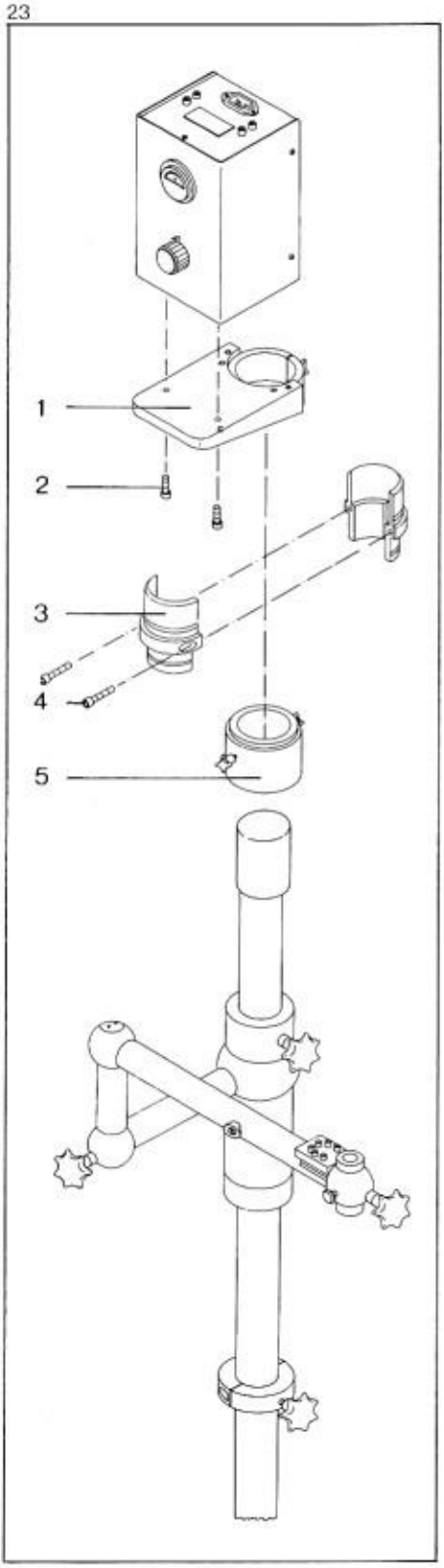
Voltages:
100-110-120-127-220-240 V
Mains frequency: 50...60 Hz (cps)
Power input: 145 VA
sec. 3...13 V 100 W max.

Power cable

- Safety plug (5) connects to mains.
- Standard CEE plug (6) connects to the power supply unit.

	Cat. No.
2 m power cable	*380071-2810*
6 m power cable	*380071-2830*

23



Mounting on floor stand

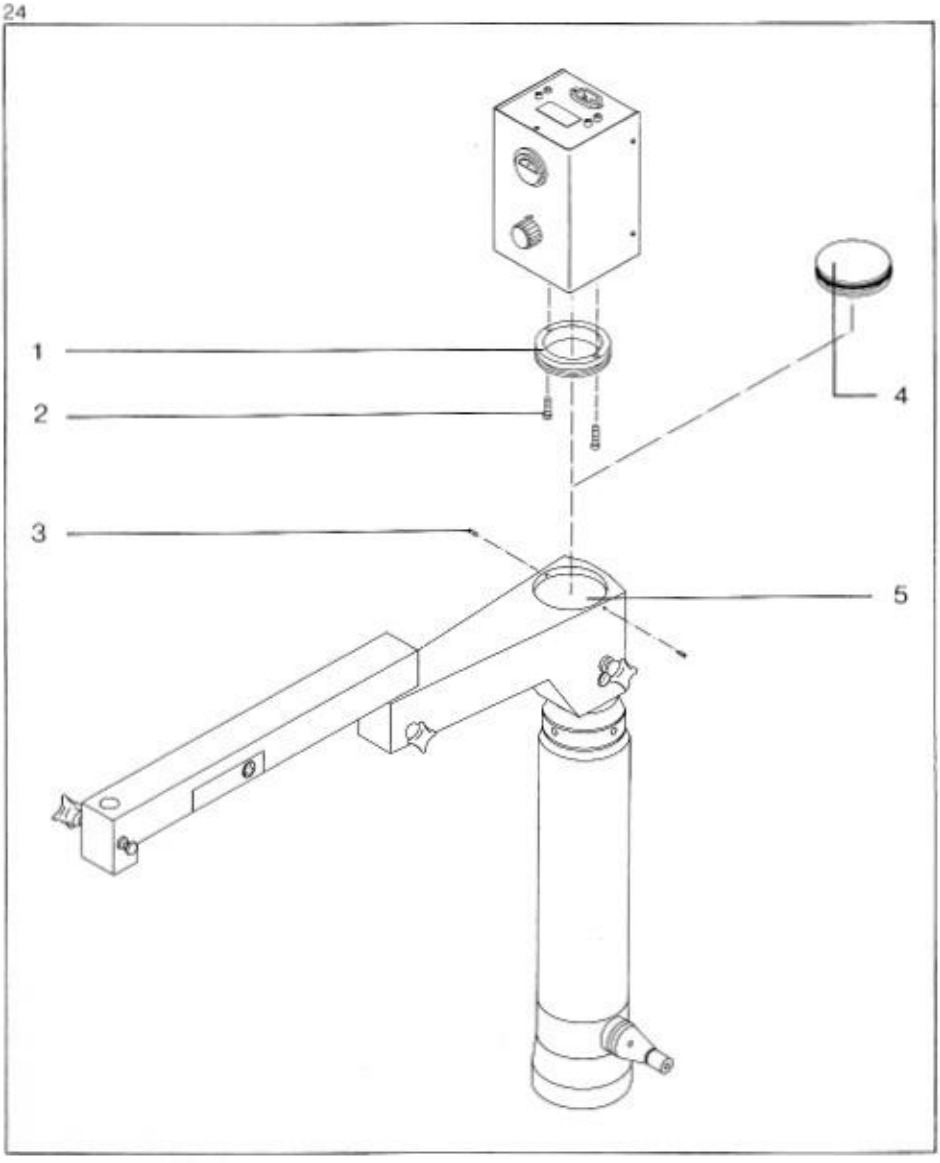
Mounting on floor stand

- Stands without 12 V power supply require a power supply unit when equipped with microscopes using halogen lamp illumination.

Mount as follows:

- Slide compensating weight (5) over stand column. Lock to two holders when mounted.
- Lock the two holder (3) with the two screws (4) to stand column.
  Clamping height should not affect the working range of the stand carrier.
  The Perlon tape of the stand must move freely in the grove of one holder.
- Attach holding plate (1) to power supply unit with the two screws (2).
- Slide power supply unit with holding plate over stand column until it rests on the two holders screwed together and lock in place.

24



Mounting on motorized stand

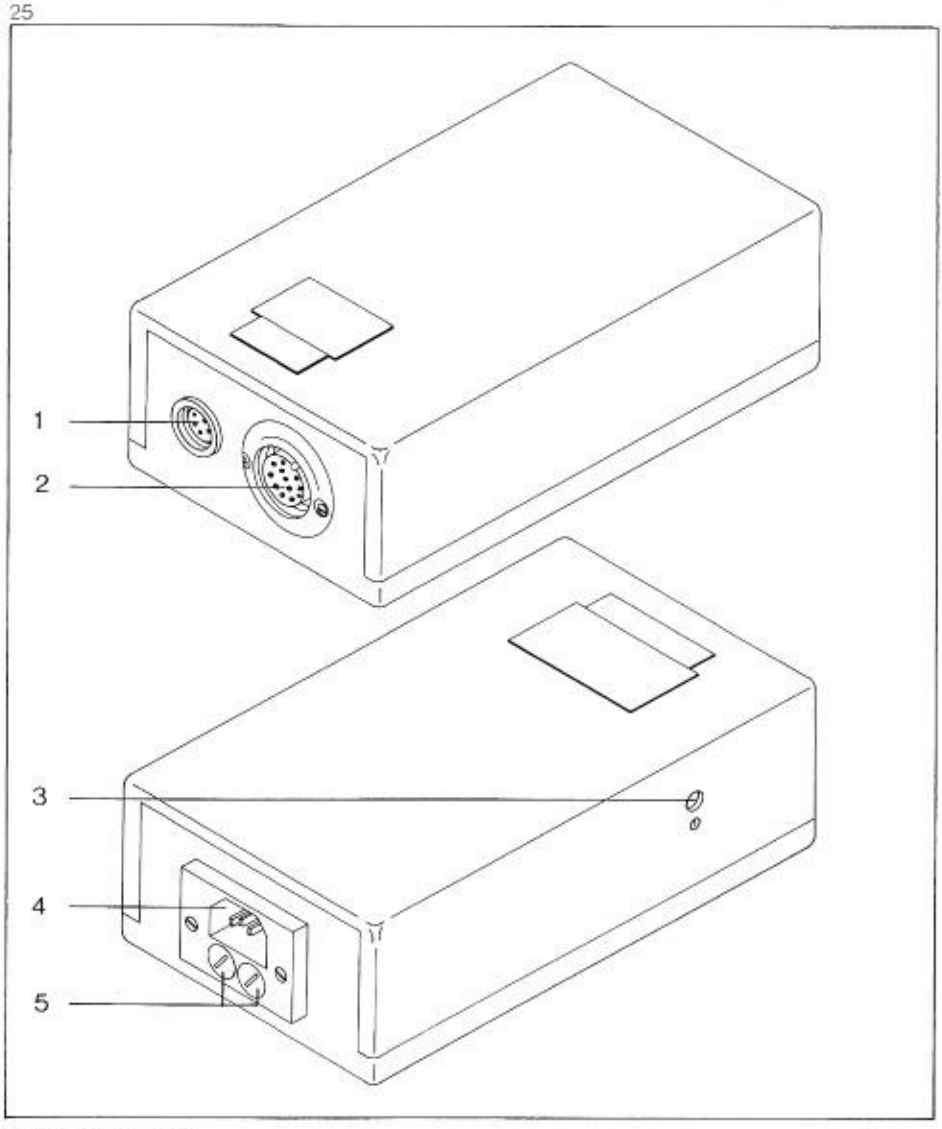
Mounting on upper part of motorized stand with manual rack-and-pinion adjustment

- Motorized stands do not have a 12 V power supply, so that a power supply unit is required when equipped with microscopes using halogen lamp illumination.

Mount as follows:

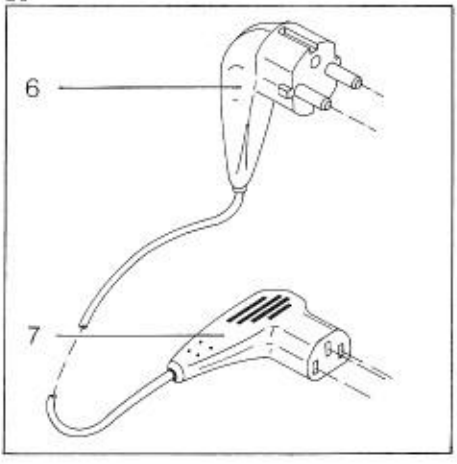
- Screw ring (1) with two screws (2) on power supply unit with the thicker rim uppermost to the power supply unit.
- Remove two screws (3) and take off lid (4).
- Introduce power supply unit with ring into hole (5). Screw in two screws (3) until ring is clamped and power supply unit does not fall out.
- Mounting to upper part of motorized stand without manual rack-and-pinion adjustment is the same.

25



Power supply unit

26



Power cable

Power supply unit for focusing and zoom system

Power supply unit
A power supply unit is required for microscope with focusing and zoom system that cannot be connected (e.g., when on table stand).

First of all check whether voltage display (3) agrees with mains voltage. If not, it must be adjusted by our service technicians. Should adjustment become necessary, the fuse links might have to be exchanged.

Outlet (1) connects the microscope plug for focusing and zoom adjustment.

Outlet (2) is for connection of a hand or pedal switch with a maximum of 6 operations.

Outlet (4) takes the power cable.

With removal of the two caps (5) the fuses (identical values) become accessible.

Specifications:

Cat. No.	*309679*
Length:	200 mm
Width:	110 mm
Height:	55 mm
Weight:	1.32 kg

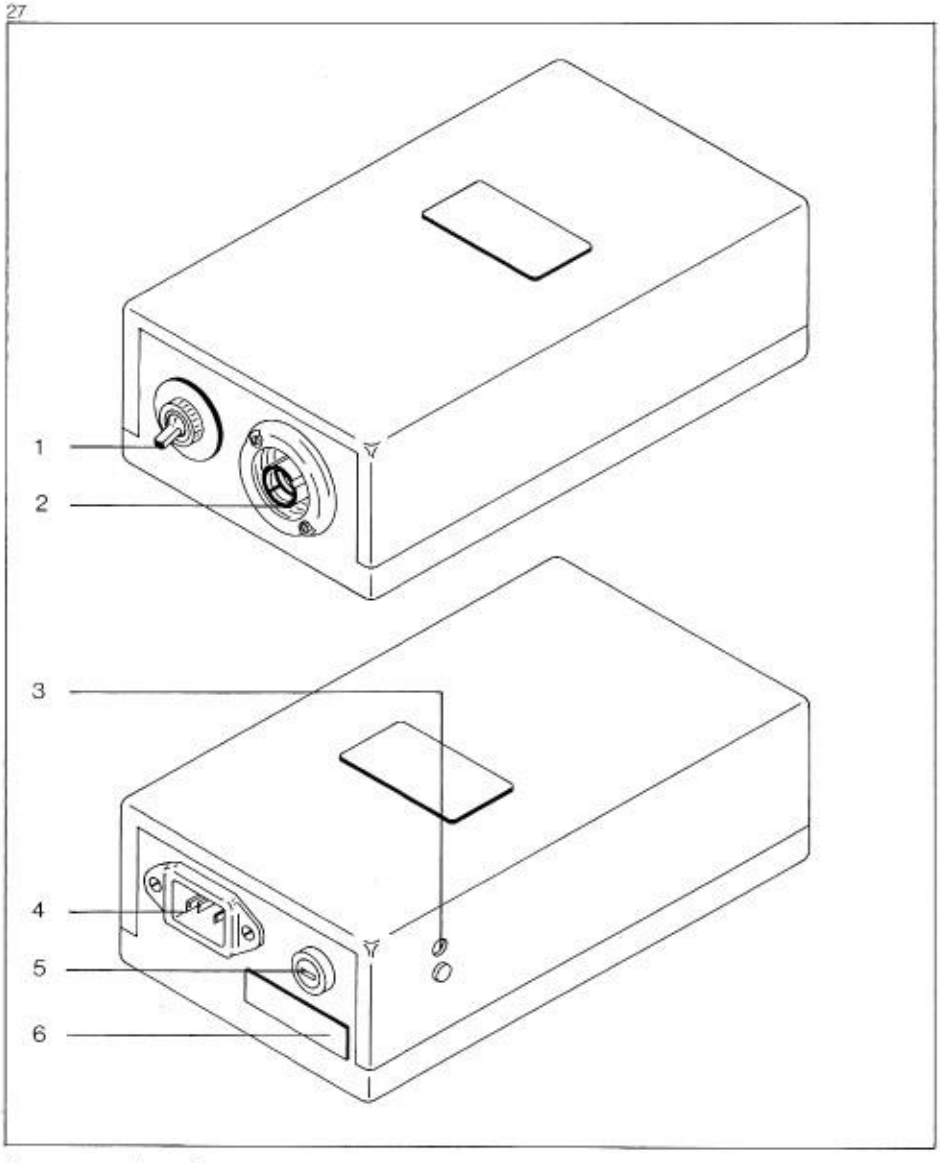
Voltages:
100-110-120-127-220-240 V
Mains frequency: 50...60 Hz (cps)
Power input: 20 VA
Fuse values
100-127 V: M 0.315 Amp. 250 V
Cat. No. 380011-8210
220-240 V: M 0.16 Amp. 250 V
Cat. No. 380018-0670

Power cable
Safety plug (6) connects to mains.

Standard CEE plug (7) connects to the power supply unit.

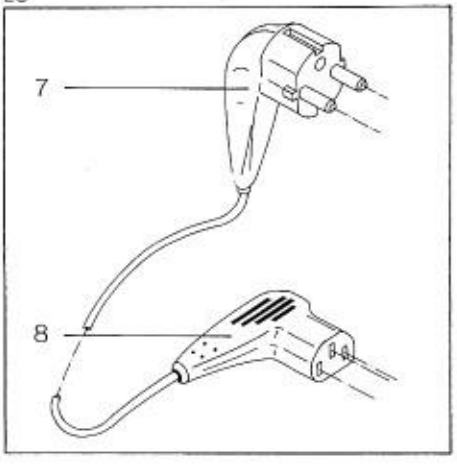
	Cat. No.
2 m power cable	*380071-2810*
6 m power cable	*380071-2830*

27



Power supply unit

28



Power cable

Power supply unit
A power supply unit is required for stands without built-in electronic flash (e.g., table stand) and used for photographic work with flash-light.

First of all check whether voltage display (3) agrees with mains voltage. If not, it must be adjusted by our service technicians.

Switch (1) turns power supply unit on and off.

Outlet (2) connects the electronic flash.

Outlet (4) takes the power cable.

The fuse values are given on plate (6).

With cap (5) removed, the fuse becomes accessible.

Specifications:

Cat. No:	*309658*
Lenght:	190 mm
Width:	110 mm
Height:	60 mm
Weight:	1.2 kg

Voltages:
100-110-120-127-220-240 V
Mains frequency: 50...60 Hz (cps)
Power input: 20 VA
Fuse values:
100-127 V: T 0.315 Amp. 250 V
Cat. No.: 380011-8210
220-240 V: T 0.16 Amp. 250 V
Cat. No.: 380018-0670

Power cable
Safety plug (7) connects to mains.

Standard CEE plug (8) connects to power supply unit.

	Cat. No.
2 m power cable	*380071-2810*
6 m power cable	*380071-2830*

Stand/mounts

29

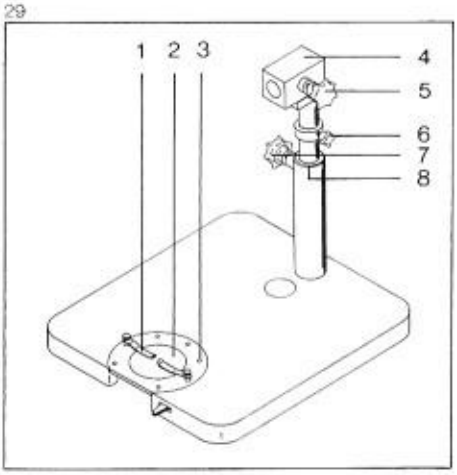


Table stand

Converting the table stand

30

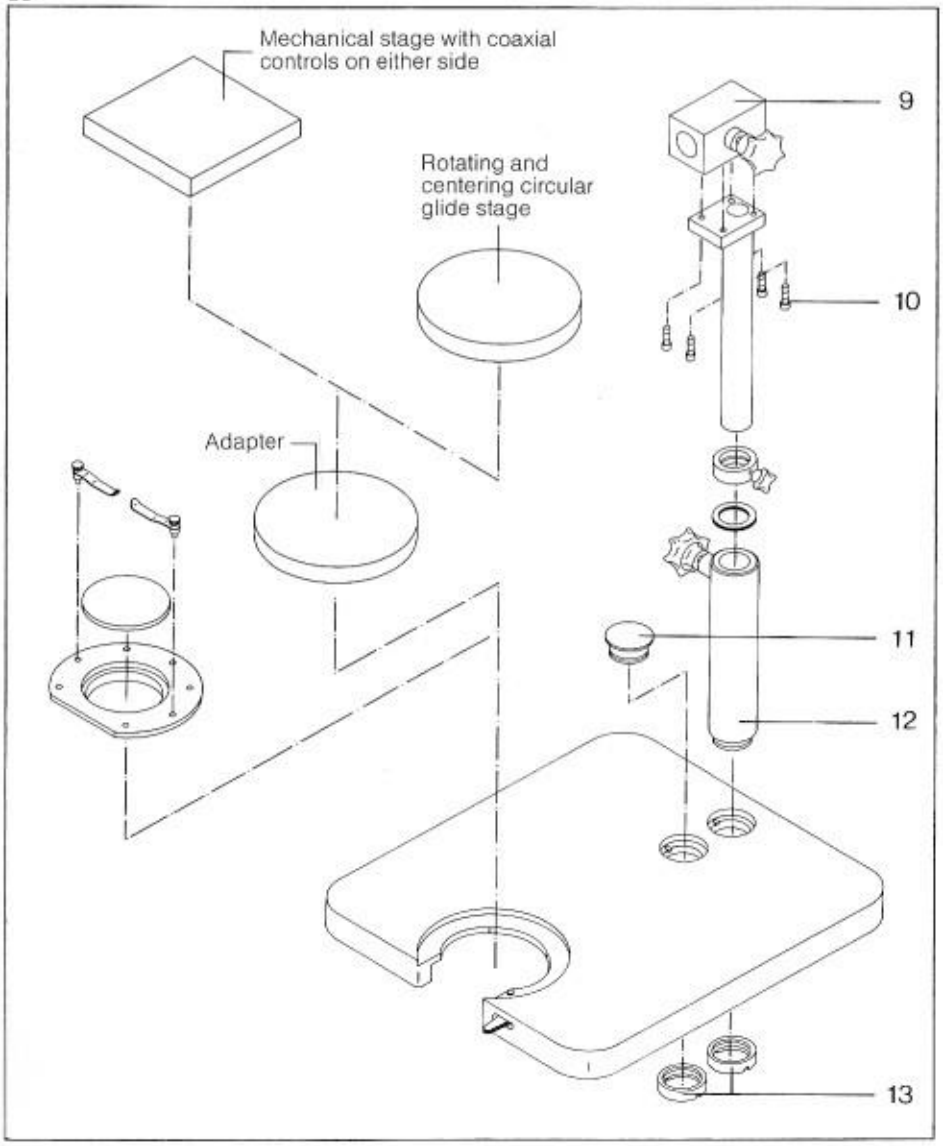


Table stand
Spring clamps (1) clamp small objects onto table plate (2). The spring clamps can be moved into holes (3), as required.

Either side of table plate (2) can be used.

Light objects – dark side
Dark objects – white side

Star knob (5) keeps the microscope from twisting.

Adjust distance between microscope and table plate with microscope carrier (4) and tighten with knob (7).

Clamping ring (6) must lie on the stand pillar (8) after clamping to secure the distance adjusted.
Cat. No. 30 52 45

Converting the table stand
If a change in working distance is required (different microscopes, different working distances) stand pillar (12) can be converted as follows:

- Remove two rings (13) from stand pillar (12) and flange (11).
- With flange (11) removed introduce stand pillar (12) into hole desired. Screw back rings (13), tightening flange and stand pillar.

In addition microscope carrier (9) can be reversed as follows:

- Unscrew four Allen screws (10).
- Reverse microscope carrier (9) and attach again with the four Allen screws.

Mechanical and glide stages for the table stand
The design of the table stand takes into account the possibility of replacing the simple table plate by different glide and mechanical stages of our microscope line. Transmitted light illumination can also be used.

The following glide and mechanical stages are available:

1. Mechanical stage with coaxial controls on either side *Cat. No. 47 34 28*

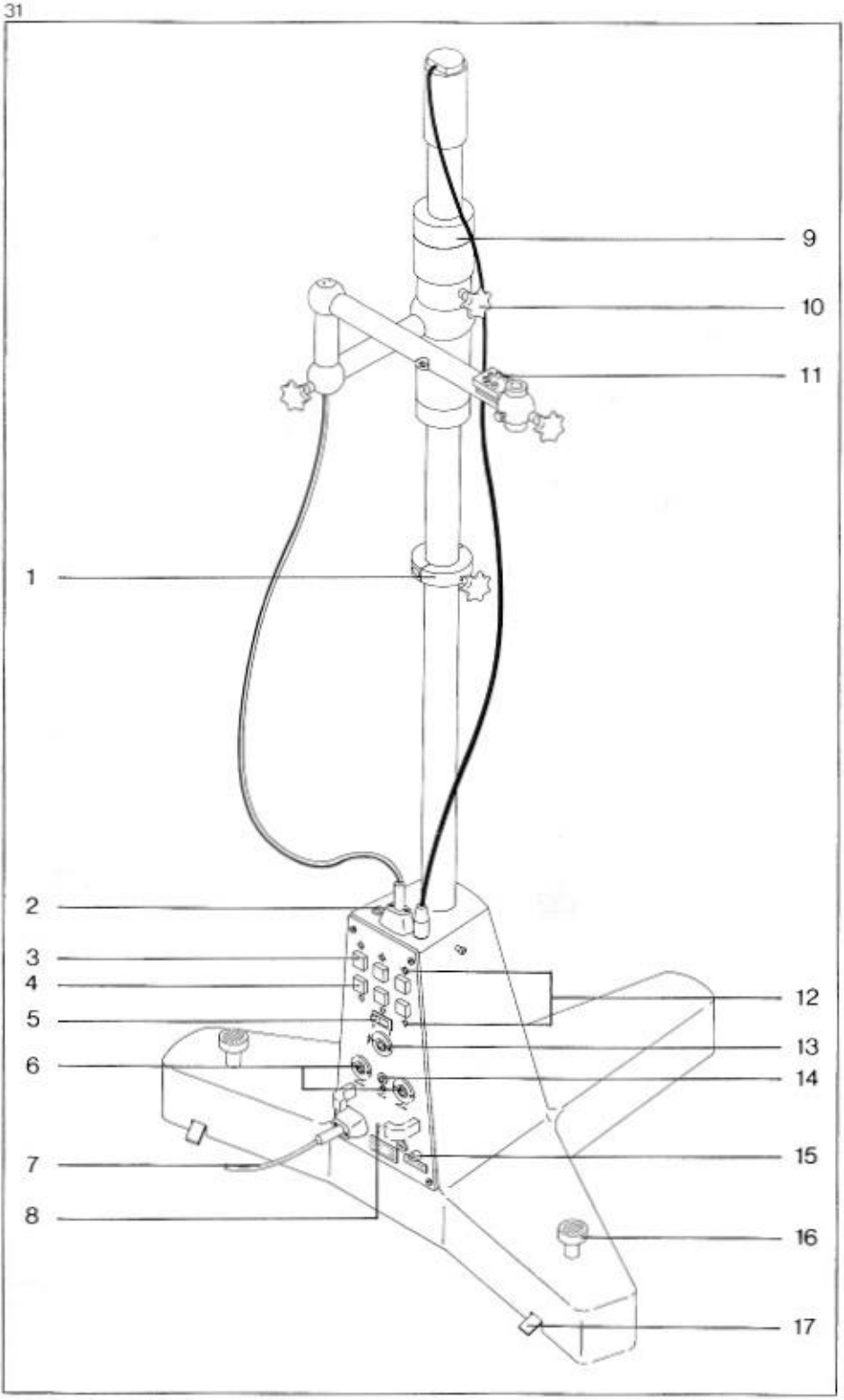
2. Rotating and centering circular glide stage 50/75 with centering piece *Cat. No. 47 34 54*

3. Rotating and centering circular mechanical stage 50/75 with centering piece without graduation *Cat. No. 47 34 56*

4. Rotating and centering circular mechanical stage 50/75 with centering piece and graduation *Cat. No. 47 34 57*

An adapter *(Cat. No. 47 52 35)* is needed to attach these mechanical and glide stages to the table stand.
For adaptation the whole table plate must be removed by turning it 90° to the right and inserting the adapter.

31



Rollable 1.88 m floor stand with motor head and Universal stand base.

See opposite

1 Lock to limit downward movement

2 Jack for connection of operation microscope with zoom system

3 Push buttons for independent overload operation of illumination systems connected to the three pairs of different colored jacks (11). The colors of the pairs of jacks (11) correspond to those of buttons (12), which light up yellow when pressed.

4 Push-buttons for independent power supply of the three pairs of different colored jacks (11). The colors of the pairs of jacks (11) correspond to those of buttons (12), which light up white when pressed.

5 Main switch. Lights up red, when in position I, indicating readines for operation.

6 Jacks for connection of pedal and/or manual control panel. They are parallel-connected for simultaneous connection of two control panels.

7 Power cable

8 Display of voltage set

9 Compensating weights

10 Clamping head for movement of stand carriage.

11 Pairs of different colored jacks. They correspond to differently colored buttons (3) and (4).

12 Color marks for pairs of jacks (11).

13 Jack for electronic flash. The in-base flash unit operates with 160 Ws.

14 Jack for connection of foot or hand control for short-time overload operation of the illumination system of buttons (4).

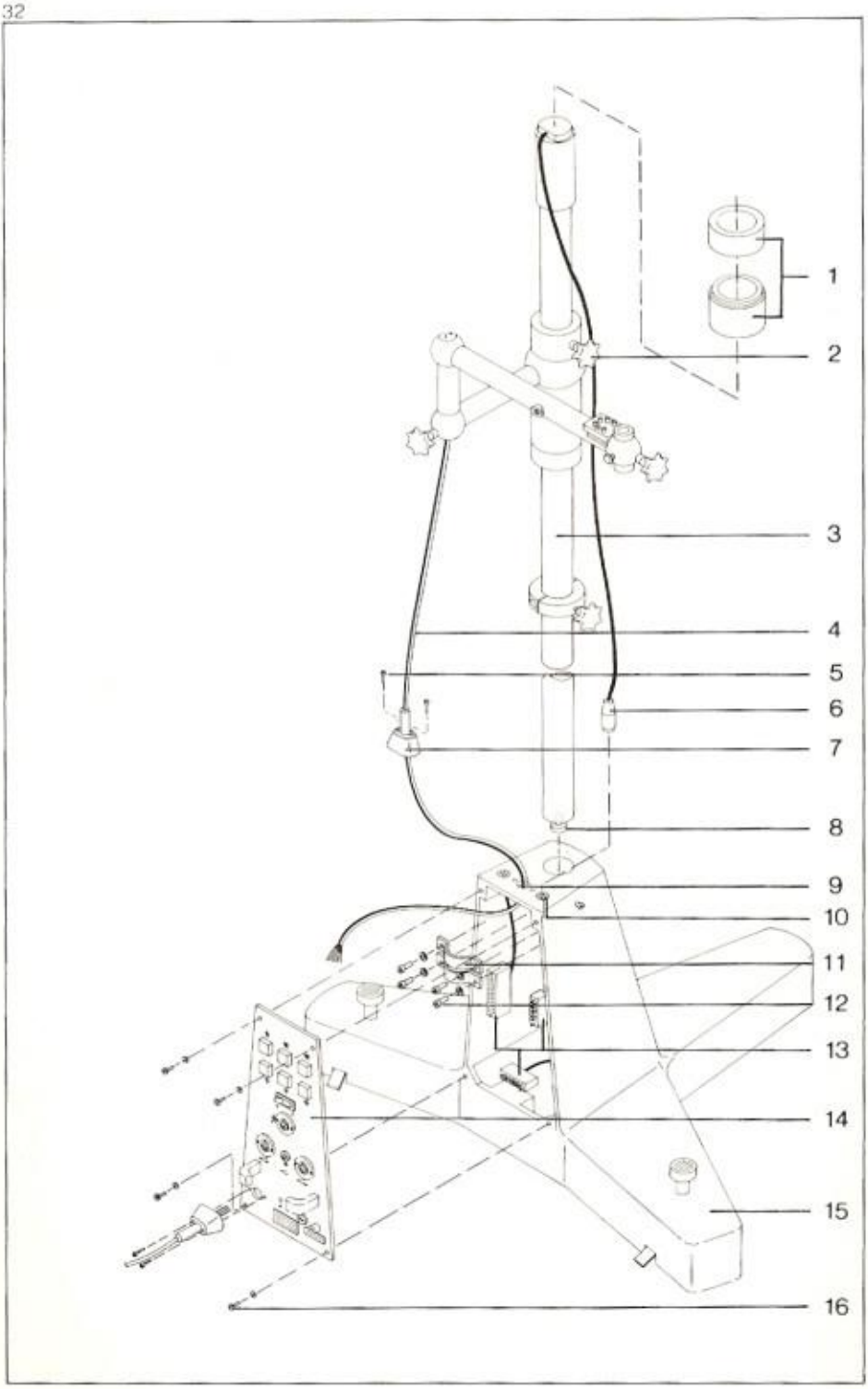
15 Stand fuses.

16 Knobs to brake and lock stand

17 Tongues to release brakes.

	Cat. No.
1.88 m column with motor head	*305373*
Balancing weight	*305210-8001*
Universal stand base	*305360*
6 m cable	*380071-2870*
6 m cable with US plug	*397902-9063*

32



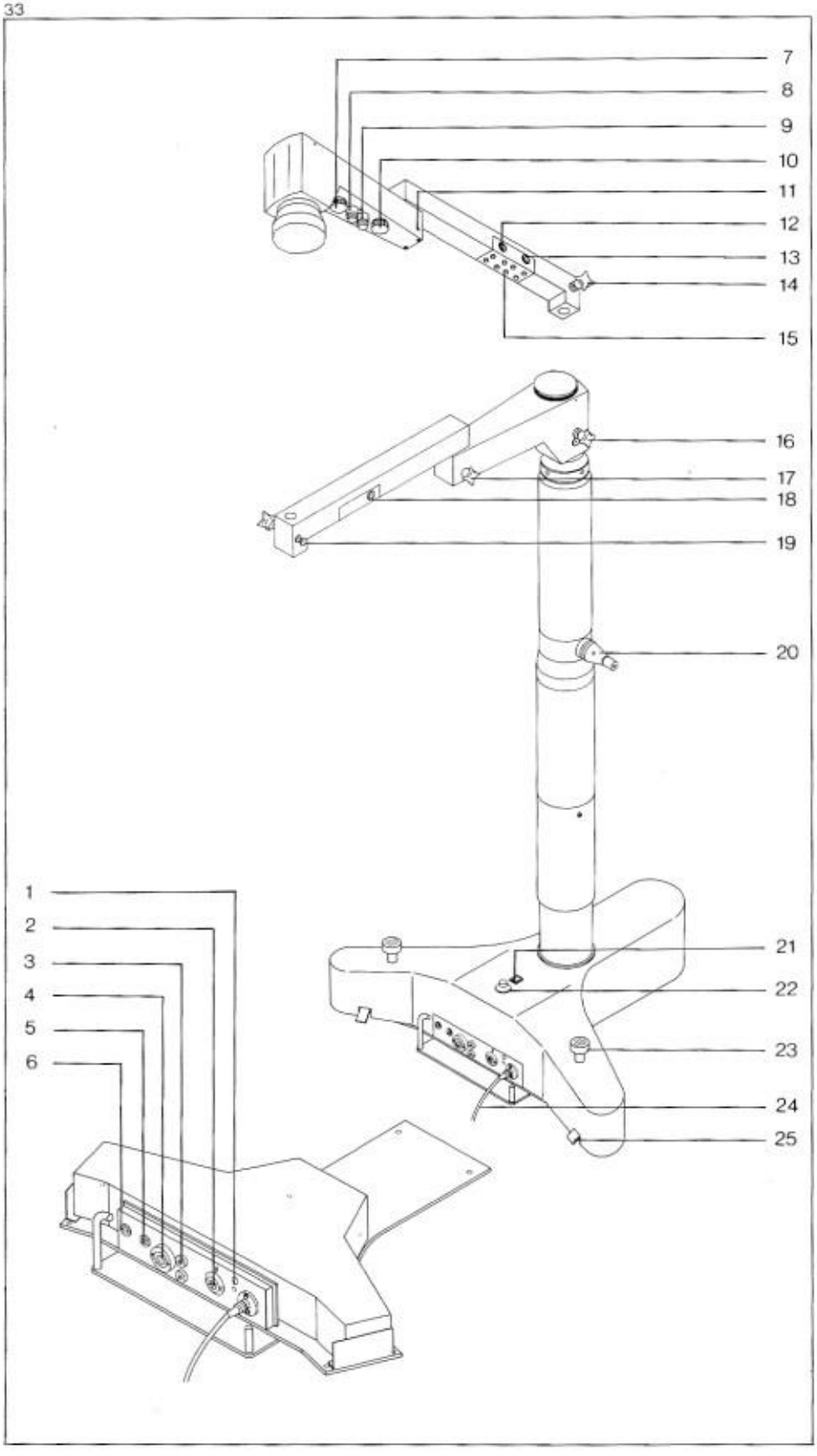
Mounting of rollable 1.88 m floor stand with motor head and Standard II base.

- The rollable floor stand is supplied in a case with stand base (15), column (3) and compensating weights (1) separately packed.
- Star knob (2) clamps the stand carrier and remains locked until mounting has been finished.

Mount as follows:

- Remove the four screws (16) and take off front plate (14).
- Loosen the four screws (12) until the two clamps (11) are loose (Tool: Allen wrench 30 52 98–000 901).
- Introduce column (3) into stand base as far as it will go.
  Rotate column until longitudinal groove of column shows to the rigth when looking at the stand from the front.
- Fix column (3) by tightening the four screws (12) of the two clamps (11).
- Release transport lock (8) of column counterweight.
- Pass cable (4) through hole (9) Introduce cable ends numbered 1 to 6 into corresponding cable clamps of front plate (14) and lock.
- Introduce cable guide (7) without tensile stress into hole (19) and attach loosely for the time being with the two screws (5) at stand base. (Attention: self-tapping screws!)
- Pull cable (4) until cable length from hole (9) to connecting strip of front plate (14) is approx. 200 mm.
- Fix cable guide (7). To this end hold cable (4) in position so that connection at connecting strip is without tensile stress.
- Join cable couplings (13) that may have become loose.
- Screw front plate (14) with the four screws (16) to stand base.
- Attach compensating weights (1) to column carrier, as necessary.
- Plug cable (6) of motor head into outlet (10).

33



Rollable motorized stand with manual rack-and-pinion adjustment
See opposite:

1 Display of voltage set.

2 Flash connection

3 Fuses

4 Jack to connect hand or pedal switch for the following operations:
Stand up/down
Continuous magnification changer (zoom) in operation microscopes e.g., Opmi 6, 7, 8
X-y coupling
Swivelling of surgical slit illuminator

5 Single switch for operation microscope magnification

6 Single switch for stand up/down

7 Turn switch for 6 V voltage supply of jacks (15)

8 Red push-button to supply jacks with overload

9 Green push-button, converts overload to normal voltage

10 Rotary switch to supply jacks (15) with 6 V voltage

11 Screw for setting greater or lesser stiffness of arm articulations

12 Jack to connect x-y coupling

13 Jack to connect operation microscopes with continuous magnification changer (zoom), e.g., Opmi 6, 7, 8.

14 Clamping head to lock microscope pivot

15 Jacks to connect operation microscope illumination

16 Clamping head to lock arm

17 Clamping head to lock arm

18 Jack to connect surgical slit illuminator

19 Catch to engage in groove of microscope pivot.

20 Drive adjustment – mechanical range/ 380 mm

21 Pilot light, – lights up if power supply to stand is on after pressing button (22).

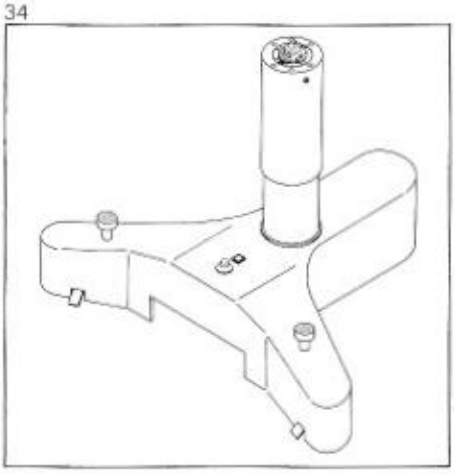
22 Push-button to turn power supply on and off

23 Knobs to brake and lock stand

24 Power cable

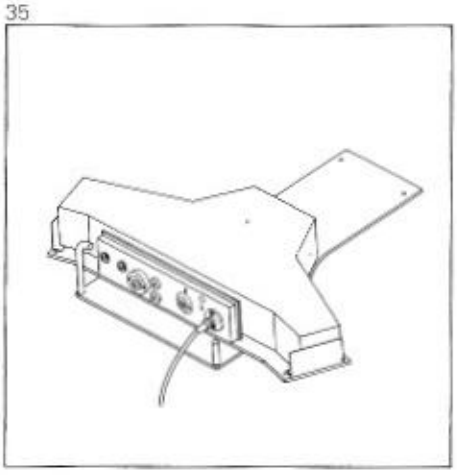
25 Tongue to release brakes

34



Motorized stand base
200–240 V 50 Hz
Lift 5 mm/sec. *30 62 46*
100–120 V 60 Hz
Lift 5 mm/sec. *30 62 47*

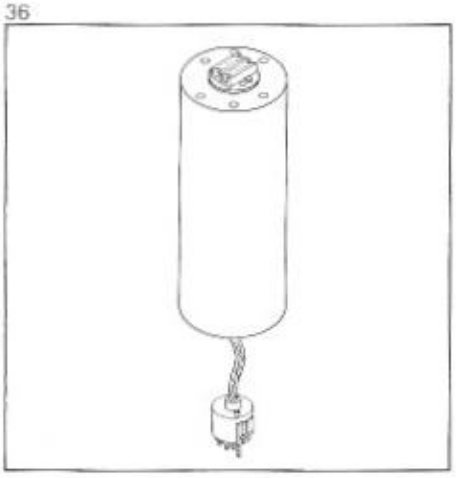
35



Electrical assembly group with connections for x-y xoupling and surgical slit illuminator with standard CEE plug *30 62 90*

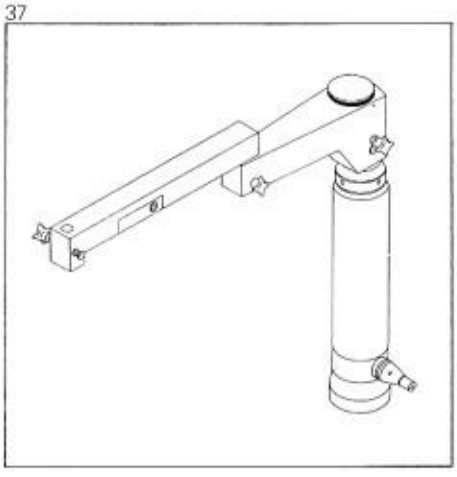
Electrical assembly group with connections for x-y coupling and surgical slit illuminator with American flat plug *30 62 90–9901*

36



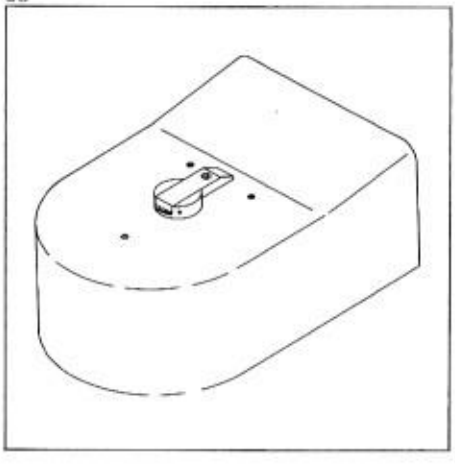
Extension
300 mm *30 52 98*

37



Upper part of motorized stand with manual rack-and pinion adjustment
305394

38

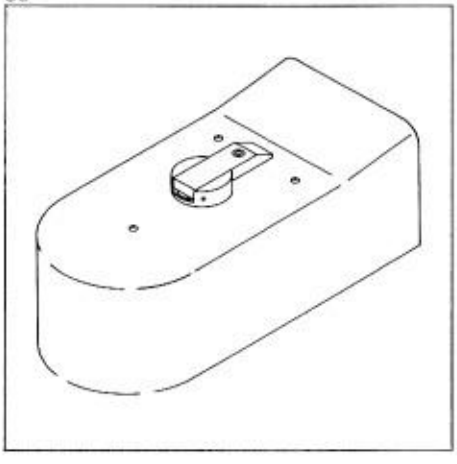


For greater stability of the motorized stands, our delivery program offers foot extensions with lead weights.

They are recommended for instrument combinations with a great number of heavy accessories.

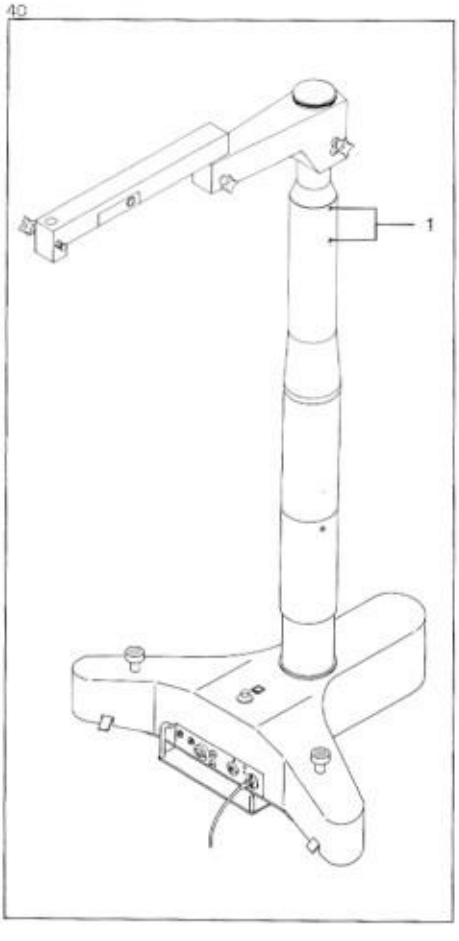
Long foot extension (1x) for one stand base *30 62 46–9002*

39



Short foot extension (2x) for one stand base *30 62 46–9001*

40



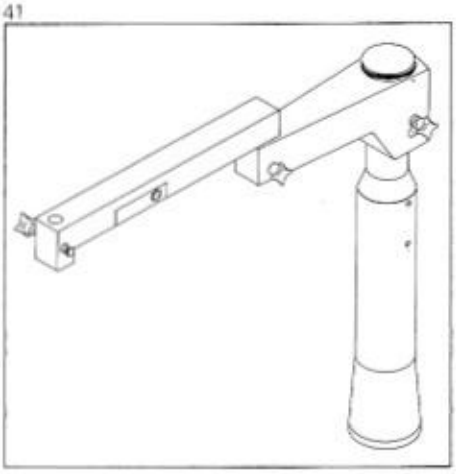
Rollable motorized floor stand
The controls of the rollable motorized floor stand are identical with those of the rollable floor stand with manual rack-and-pinion adjustment with one exception.

The rollable motorized floor stand with manual rack-and-pinion adjustment has a crank handle to lift/lower the upper part of the stand within a range of 380 mm.

The rollable motorized floor stand, however, has screws (1) for locking it in the position desired. Its mechanical adjustment range is 380 mm.

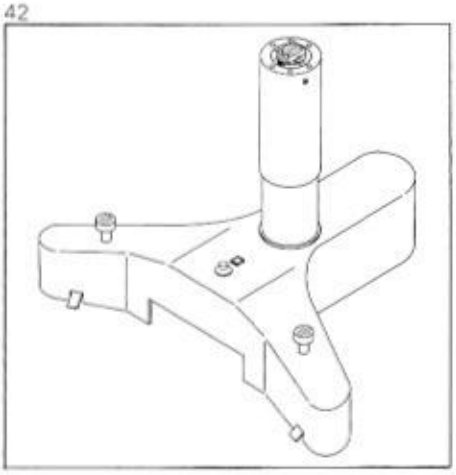
The Cat. Nos. given on pp. 42 and 43 apply also to the rollable motorized floor stand, with the exception of the modules indicated in the following.

41



Upper part of motorized floor stand *305491*

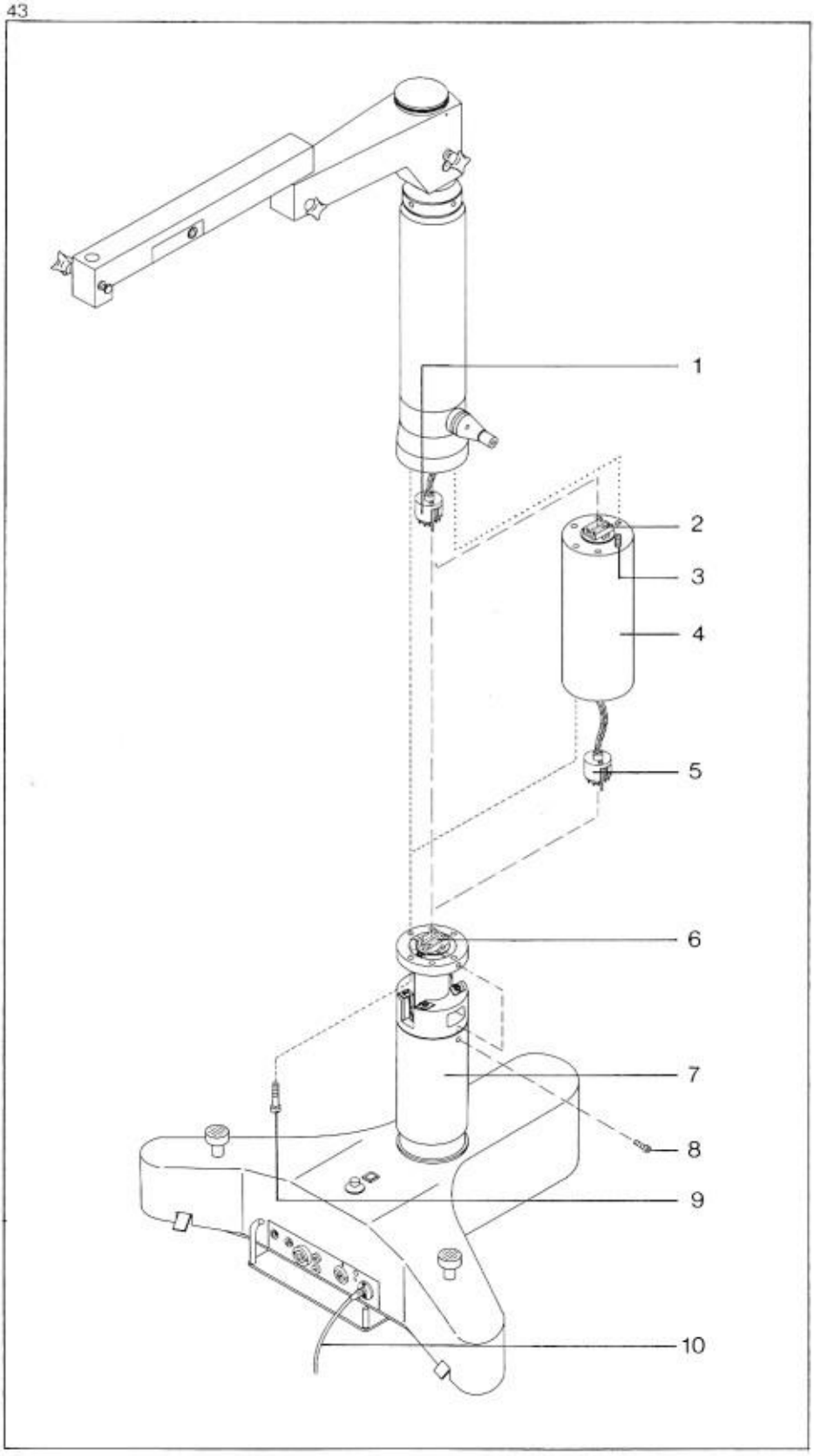
42



Motorized stand base

200–240 V 50 Hz Lift 5 mm/sec.	*306246*
100–120 V 60 Hz Lift 5 mm/sec.	*306247*
200–240 V 50 Hz Lift 15 mm/sec.	*306249*
100–120 V 60 Hz Lift 15 mm/sec.	*306250*

43



Mounting of rollable motorized floor stand with manual rack-and-pinion adjustment

Extension (4) can be incorporated on customer's request.

Mounting of the motorized stand with extension is as follows:

- Connect power cable (10) to mains.
- Introduce hand or foot pedal switch into electrical assembly group of stand base and lift stand base to top position.
- Disconnect power cable from mains.
- Loosen three screws (8) and lower cover tube (7).
- Introduce plug (1) into jack (2) and tighten connection with the two plug screws.
- Attach extension (4) to upper part by screwing in six screws (3) with wrench 30 52 98–0000901.
- Introduce plug (5) into jack (6) and tighten connection with the two plug screws.
- With Allen wrench screw six screws (9) into extension with upper part mounted.
- Push up cover tube (7) and fix with three screws (8).

Electromotive ceiling mount
Contraves floor stand and ceiling mount

These stands and mounts have their own instructions for mounting and operation.

Installation instructions for electromotive ceiling mount M 30-058

Operating instructions for electromotive ceiling mount G 30-058

Installation instructions for Contraves stand (Unpacking) M 30-05605

Operating instructions for Contraves floor stand G 30-05605

Operating instructions for Contraves ceiling mount G 30-05606

Mounting of microscopes on stands/mounts

44

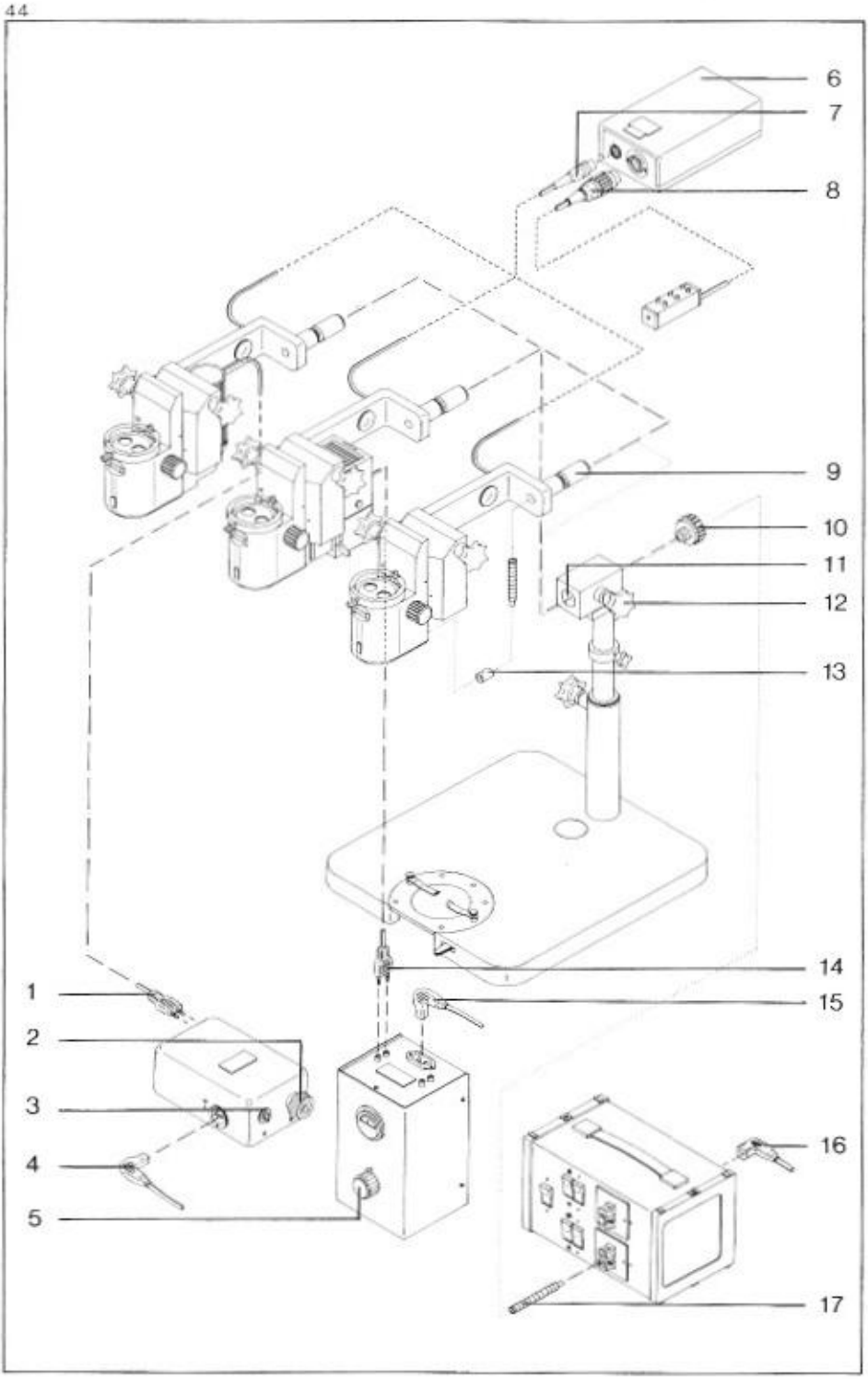


Table stand
Mounting of the microscope on the table stand is as follows:

- Slide microscope pivot (9) into hole (11) of microscope carrier.
- Attach microscope with locking screw (10) and tighten with clamping head (12).

Making the filament lamp microscope ready for use:

- Plug microscope plug (1) into one of three pairs of black jacks of the power supply unit.
- Turn on switch (3) and adjust brightness of filament lamp with regulator (2).
- Introduce plug (7) for zoom-adjustment and plug (8) of hand control into power supply unit (6). A hand or foot control with 6 functions can be connected.

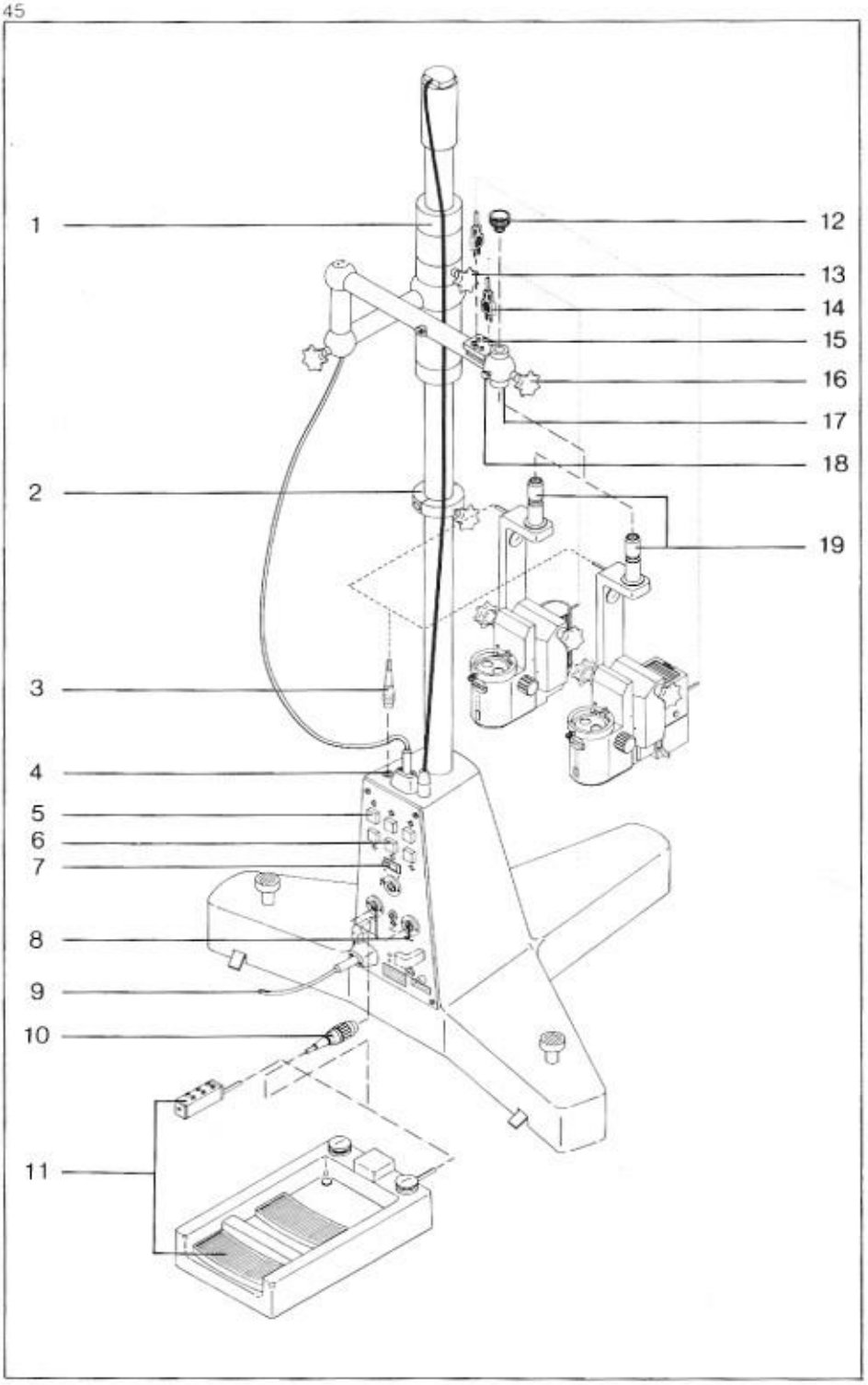
Making the halogen lamp microscope ready for use:

- Introduce microscope plug (14) into one of the two pairs of black jacks of the power supply unit.
- Connect power cable (15) to power supply unit and mains.
- Switch on regulator (5) and adjust brightness of halogen lamp.
- Introduce plug (7) for zoom-adjustment and plug (8) of hand control into power supply unit. A hand or foot control with 6 functions can be connected.

Making the fiber optic microscope ready for use:

- Introduce light guide (17) into top or bottom lamp holder of power supply unit as far as it will go and clamp in place.
- Pass light guide through locking screw (10), through microscope carrier and microscope pivot (9).
- Remove jack (13) taking the light guide, from the microscope. Introduce light guide into jack as far as it will go and attach light guide with grub screw of jack.
- Connect power cable (16) to power supply unit and mains. Switch on both main switch of power supply unit and lamp holder connected to light guide.
- Introduce light guide with jack (13) into microscope hole until illuminated field has diameter desired. Clamp light guide with jack.
- Introduce plug (7) for zoom adjustment and plug (8) of hand control into power supply unit (6). A hand or foot control with 6 functions can be connected.

45



Rollable 1.88 m floor stand with motor head and Universal stand base
Mounting microscopes with filament lamp illumination or halogen lamp illumination on rollable 1.88 m floor stand with motor head and Universal stand base and making them ready for use:

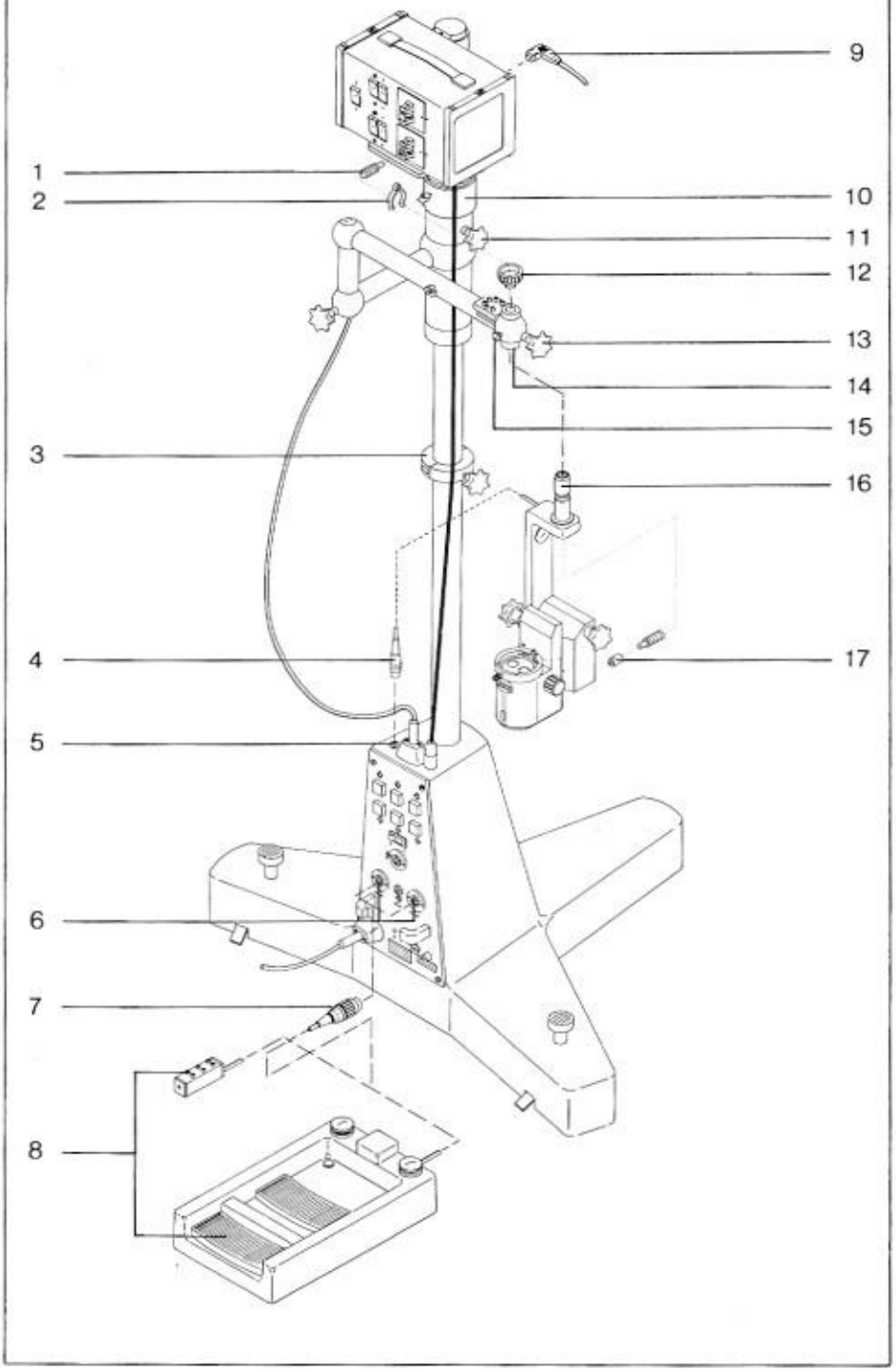
- Slide microscope pivot (19) into hole (17) of articulated stand arm. Catch (18) must engage in groove of microscope pivot.
- Attach microscope with locking screw (12). Star knob (16) locks the microscope in any position desired.

Introduce microscope plug (14) in one of the three pairs of different colored jacks, (with halogen lamp illumination into 12 V jack).

Connect power cable (9) to mains.

- Turn main switch (7) from 0 to I. Readiness for operation is indicated by red light.
- Push button (6). Depending on their colors, the individual pairs of jacks (15) become active. The button pressed lights up white. Now power supply with normal voltage is given for the operation of 6 V or 12 V lamps.
- Push button (5). Depending on their colors, the individual pairs of jacks (15) operate independently with overload. The button pressed lights up yellow.
- Introduce plug (3) of focusing and zoom system into jack (4).
- Introduce plug (10) of hand or foot control (11) *(309984* or *309591)* into one of jacks (8).
- Unscrew clamping head (13). Stand carriage with microscope equipment can now be moved up and down.
- Safety ring (2) limits the downward movement of the stand carriage for sufficient object distance.
- Depending on the weight of the microscope equipment, compensating weights (1) are added from the top. These compensating weights balance the counterweight within the column and the weight of the microscope equipment.
With the equilibrium set, the microscope runs smoothly along the column and rests in any position without having to use clamping head (13).

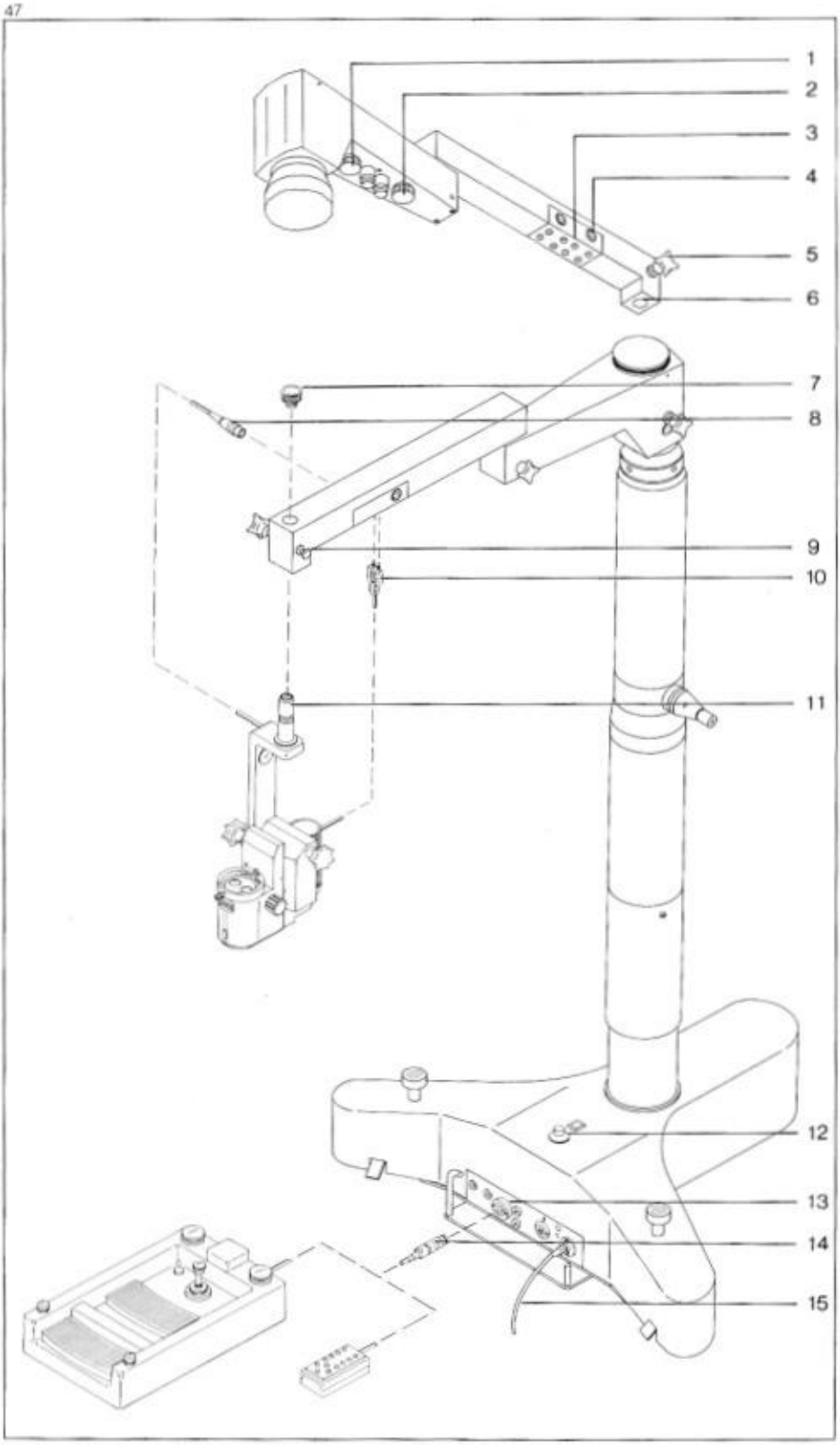
46



Rollable 1.88 m floor stand with motor head and Universal stand base
Mounting the microscope with fiber illumination on rollable 1.88 m floor stand with motor head and Universal stand base and making it ready for use:

- Slide microscope pivot (16) into hole (14) of articulated stand arm.
- Attach microscope with locking screw (12) and lock with clamping head (13).
- Introduce light guide (1) into top or bottom lamp holder of power supply unit as far as it will go and clamp in place.
- Pass light guide through locking screw (12), through articulated stand arm and microscope pivot.
- Remove jack (17) taking the light guide from the microscope. Pass light guide through jack as far as it will go and attach light guide with grub screw of jack.
- Connect power cable (9) to power supply unit and mains. Switch on both main switch of power supply unit and lamp holder connected to light guide.
- Introduce light guide with jack (17) into microscope hole until illuminated field has diameter desired. Clamp light guide with jack.
- Cable clamp (2) *(30 34 91)* attaches light guide to articulated stand arm.
- Insert plug (4) of focusing and zoom system into jack (5).
- Insert plug (7) of hand or foot control (8) *(30 99 84* or *30 95 91)* into one of jacks (6).
- Loosen clamping head (11). Stand carriage with microscope equipment can now be moved up and down.
- Safety ring (3) limits the downward movement of the stand carriage for sufficient object distance.
- Depending on the weight of the microscope equipment, remove compensating weight (10) clamped to the holding plate and place on stand carriage. The compensating weight balances the counterweight within the column and the weight of the microscope equipment. With equilibrium set, the microscope runs smoothly along the column and rests in any position without having to use clamping head (11).

47



Rollable motorized stand with manual rack-and-pinion adjustment
Mounting the filament lamp microscope on rollable motorized floor stand with manual rack-and-pinion adjustment and making it ready for use:

- Slide microscope pivot (11) into hole (6) of articulated stand arm. Catch (9) must engage in groove of microscope pivot.
- Attach microscope with locking screw (7) and clamp in position with clamping head (5).
- Insert microscope plug (10) into one of four separate pairs of jacks (3).
- Insert plug (8) of focusing and zoom system into jack (4).
- Insert plug (14) of hand or foot control into jack (13).

Connect power cable to mains and push button (12).

Turn on switch (1) or (2) for respective pair of jack.

The microscope is now ready for use.

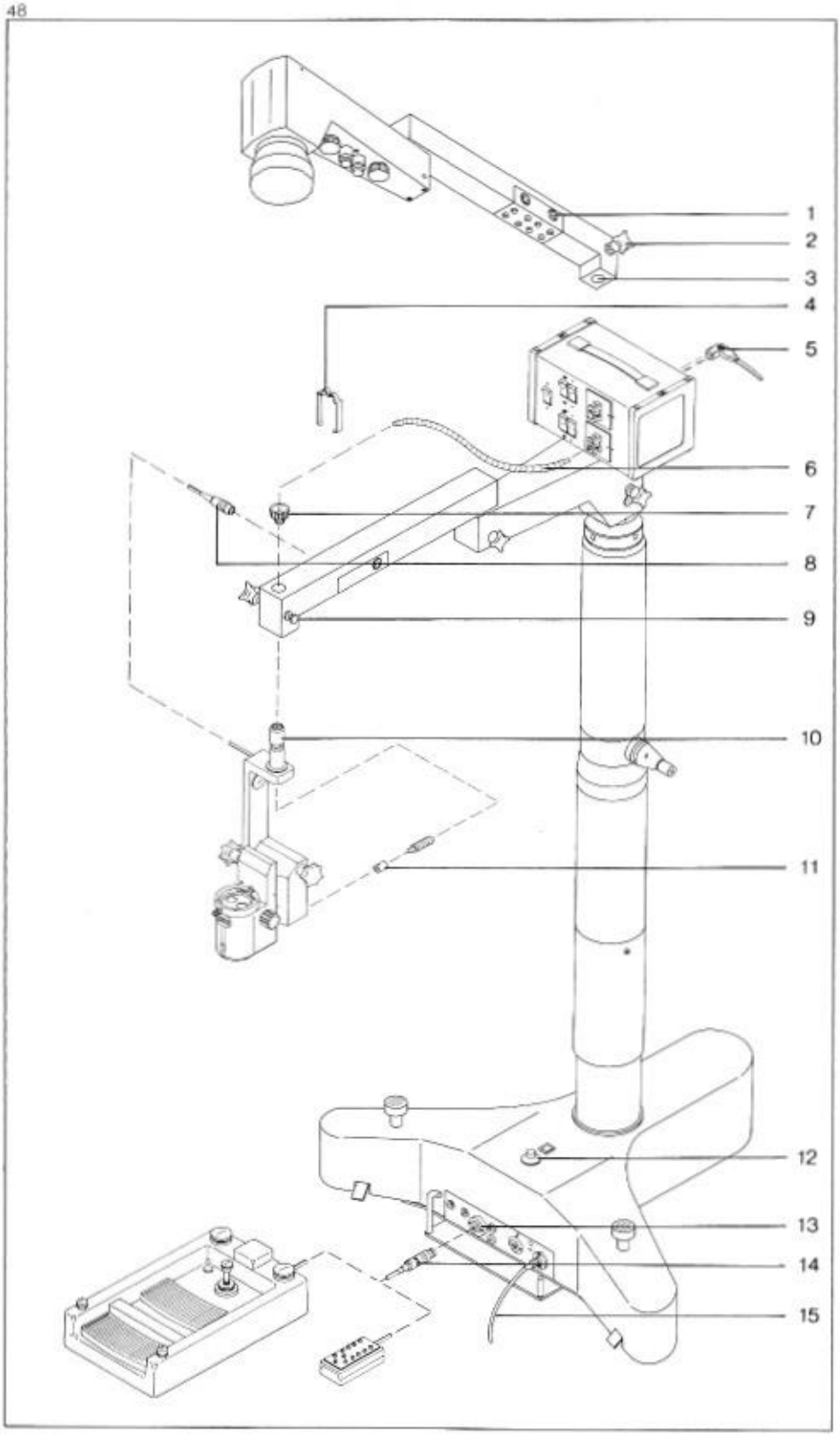
When using electrical assembly group *(30 62 90)* with outlet for x-y coupling and surgical slit illuminator, a hand or foot control with 12 functions is required.

Hand control panel	*30 59 03*
Foot control panel	*30 95 99*

When using electrical assembly group *(30 62 88)* without outlet for x-y coupling and surgical slit illuminator, a hand or foot control with 6 functions is required.

Hand control panel	*30 99 84*
Foot control panel	*30 95 91*

For other instrument combinations to be used together with the motorized stand, refer to Figs. 33 and 40 on pp. 40 and 44 as to controls and their functions.


48
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Rollable motorized stand with manual rack-and-pinion adjustment
Mounting the fiber illumination microscope on rollable motorized floor stand with manual rack-and-pinion adjustment and making it ready for use:

- Slide microscope pivot (10) into hole (3) of articulated stand arm. Catch (9) must engage in groove of the microscope pivot.
- Attach microscope with locking screw (7).
- Clamping head (2) locks microscope in any position desired.
- Introduce light guide (6) into top or bottom lamp holder of power supply unit as far as it will go and clamp in place.
- Pass light guide (6) through locking screw (7), articulated stand arm and microscope pivot (10).
- Remove jack (11) taking light guide from the microscope.
  Pass light guide (6) through jack as far as it will go and attach light guide with grub screw of jack.
- Connect power cable (5) to power supply unit and mains.
  Switch on main switch of power supply unit and lamp holder connected to light guide.
- Introduce light guide (11) with jack into microscope hole until illuminated field has diameter desired.
  Clamp light guide with jack.
- Fix light guide with cable clamp (4) *(30 34 92)* to articulated stand arm.
- Insert plug (8) of focusing and zoom system into jack (1).
- Insert plug (14) of hand or foot control into jack (13).
- Connect power cable (15) to mains and push button (12).

The microscope is now ready for use.
When using electrical assembly group *(30 62 90)* with outlet for x-y coupling and surgical slit illuminator, a hand or foot control with 12 functions is required.

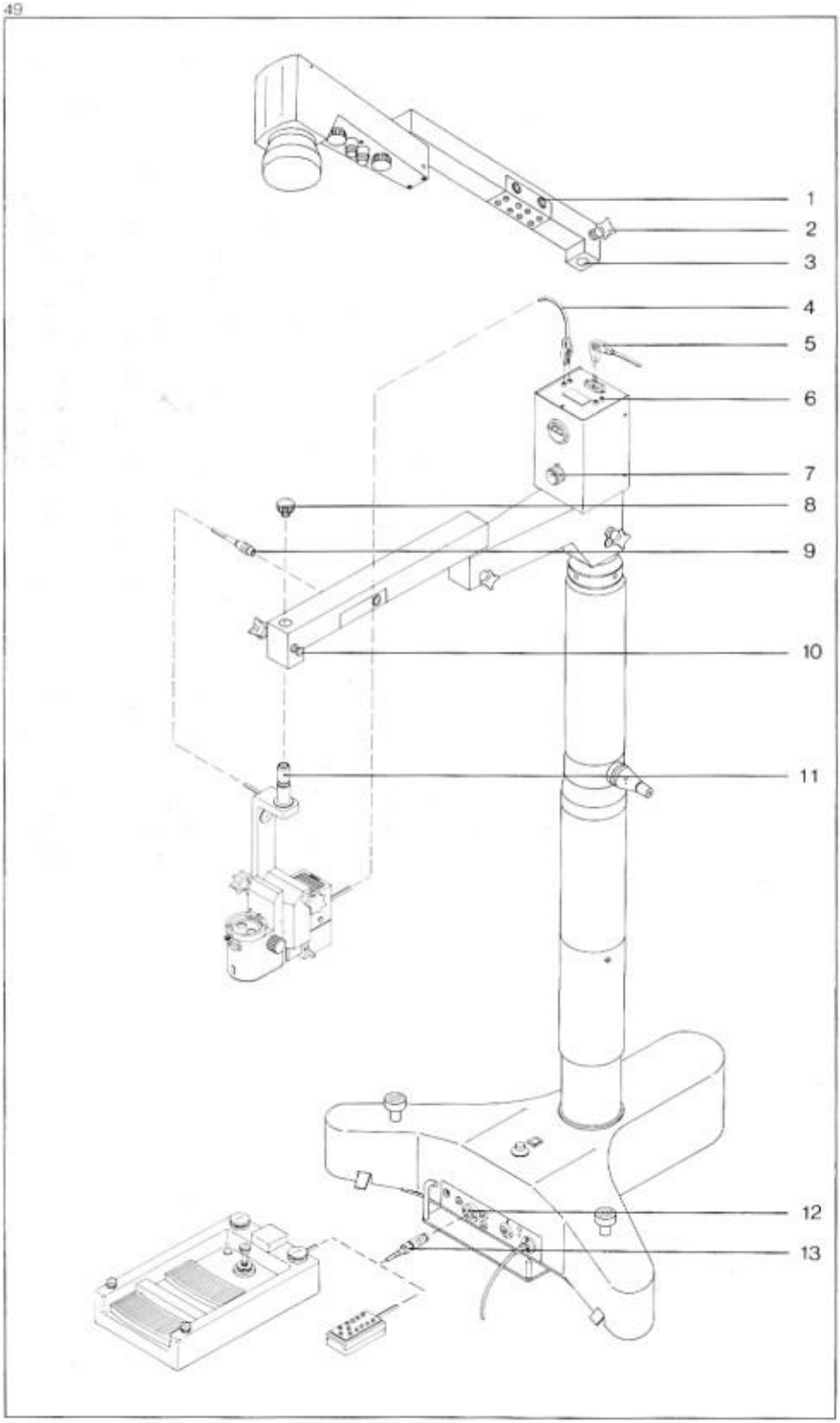
Hand control panel	*309503*
Foot control panel	*309599*

When using electrical assembly group *(30 62 88)* without outlet for x-y coupling and surgical slit illuminator, a foot or hand control with 6 functions is required.

Hand control panel	*309984*
Foot control panel	*309591*

For other instrument combinations used together with the motorized stand refer to Figs. 33 and 40 on pp. 40 and 44 as to controls and their functions.

49



Rollable motorized floor stand with manual rack-and-pinion adjustment
Mounting the microscope with halogen lamp illumination on motorized stand with manual rack-and-pinion adjustment and making it ready for use:

- Introduce microscope pivot (11) into hole (3) of articulated stand arm. Catch (10) must engage in groove of the microscope pivot.
- Attach microscope with locking screw (8) and clamp in place with clamping head (2).
- Insert microscope plug (4) into one of the two pairs of jacks (6) of power supply unit.
- Insert plug (9) of focusing and zoom system into jack (1).
- Insert plug (13) of foot or hand control into jack (12).
- Connect power cable (5) to power supply unit and mains.
- Turn on switch (7) and set lamp voltage to 12 (displayed by voltmeter of power supply unit).

The microscope is now ready for use.

When using electrical assembly group *(20 62 90)* with outlet for x-y coupling and surgical slit illuminator a hand or foot control with 12 functions is required.

Hand control panel	*30 95 03*
Foot control panel	*30 95 99*

When using electrical assembly group *(30 62 88)* without outlet for x-y coupling and surgical slit illuminator a hand or foot control with 6 functions is required.

Hand control panel	*30 99 84*
Foot control panel	*30 95 91*

For other instrument combinations used together with the motorized stand refer to Figs. 33 and 40 on pp. 40 and 44.

Modules

Microscopes and homogeneous lamps with filament lamp illumination can be retrofitted for fiber illumination.

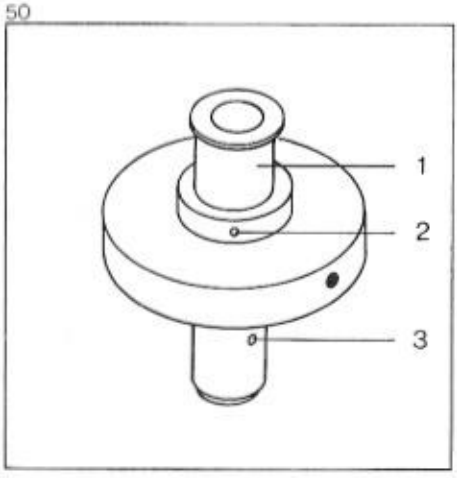
A light guide and power supply unit are required for fiber illumination.
The power supply unit with accessories is described from page 16 on.

The microscope's filament lamp cap has to be replaced by a lamp cap for taking the light guide.

Microscopes and homogeneous illuminators with interior bayonet lamp caps require cap *30 34 77*.

Microscopes (slit illuminators and homogeneous illuminators have only interior bayonet lamp caps) equipped with outside bayonet lamp caps require cap *30 34 84*.

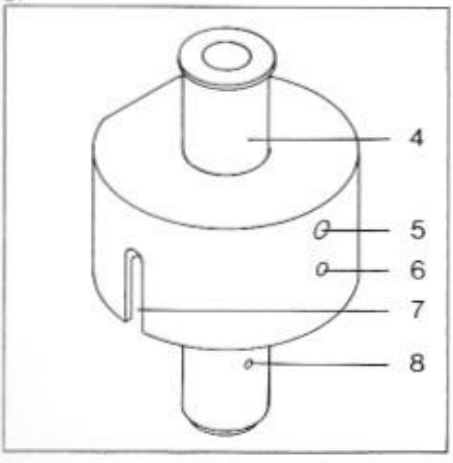
50



Lamp cap:
Screw (2) locks height of objective (1).

Screw (3) locks light guide. With lamp cap placed on the lamp housing, introduce light guide until illuminated field has diameter desired.
Cat. No.: 30 34 77

51



Lamp cap:
Screw (5) locks height of objective (4).

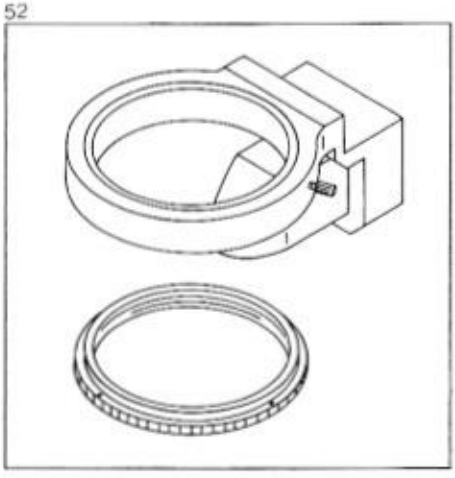
Tightening screw (6) clamps lamp cap to lamp housing.

Pin of lamp housing must be introduced into groove (7).

Screw (8) fixes the light guide. With lamp cap placed on the lamp housing introduce light guide until illuminated field has diameter desired.
Cat. No. 30 34 84

The modules illustrated in Figs. 52 – 55 can be attached in addition to the microscope without having to exchange the lamp cap. Mounting is described on p. 66.

52

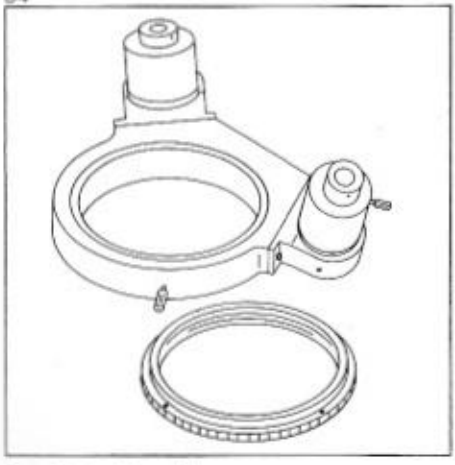


Coaxial fiber illumination system *303476*

53

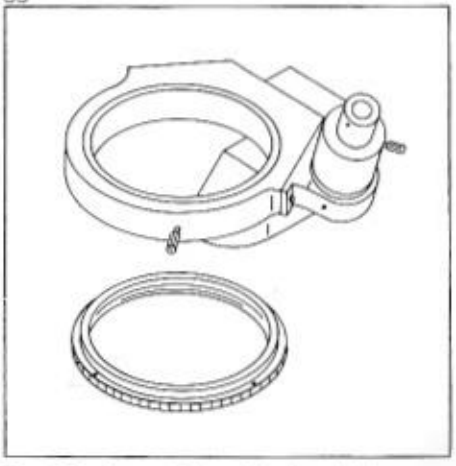
Single inclined fiber illumination system *303478*

54



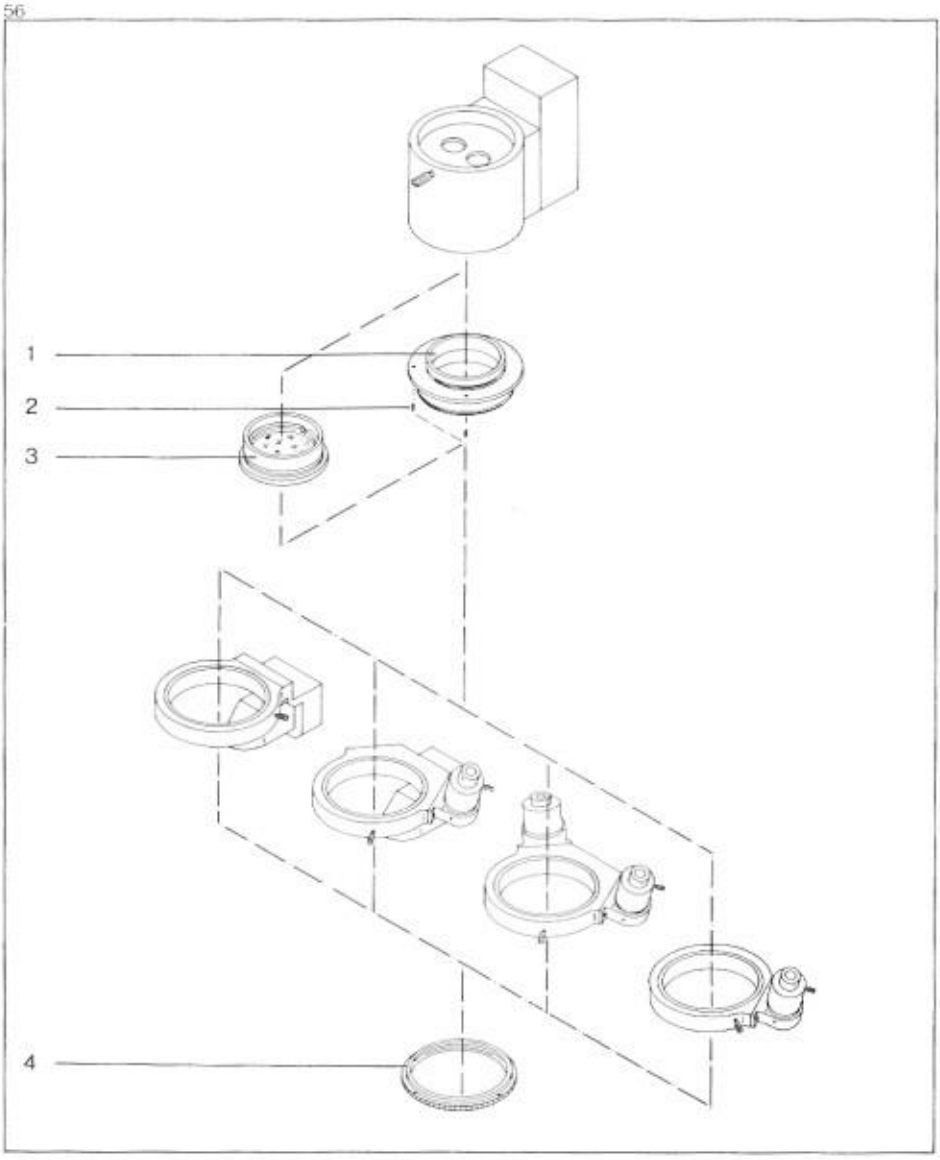
Double inclined fiber illumination system *303482*

55



Combined coaxial and inclined fiber illumination systems *303483*

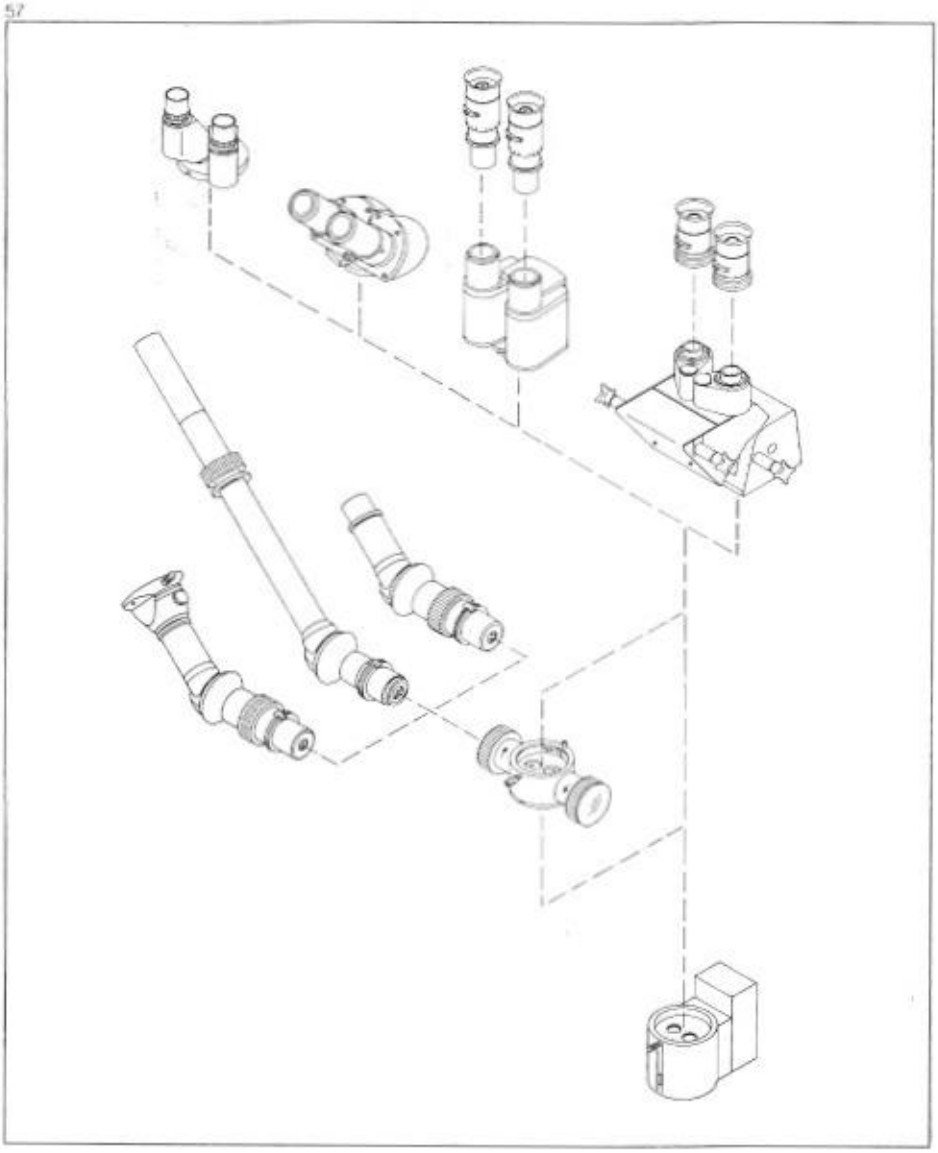
56



Mount fiber illumination on microscope as follows:

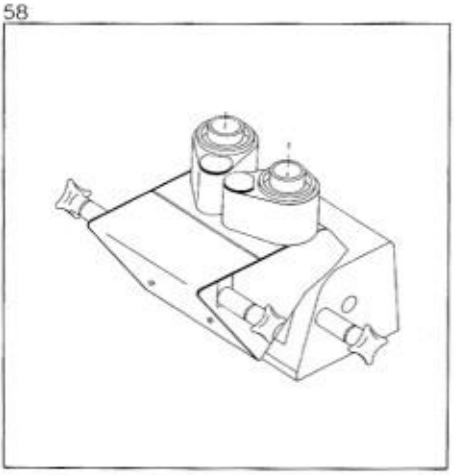
- Unscrew objective (3) from microscope and screw ring (1) into microscope thread.
- Keep ring (1) from twisting by srewing two grub screws (2) into microscope body.
- Screw objective (3) back into ring (1) as far as it will go.
- Slide fiber illumination onto ring and secure by screwing on knurled ring (4).

57



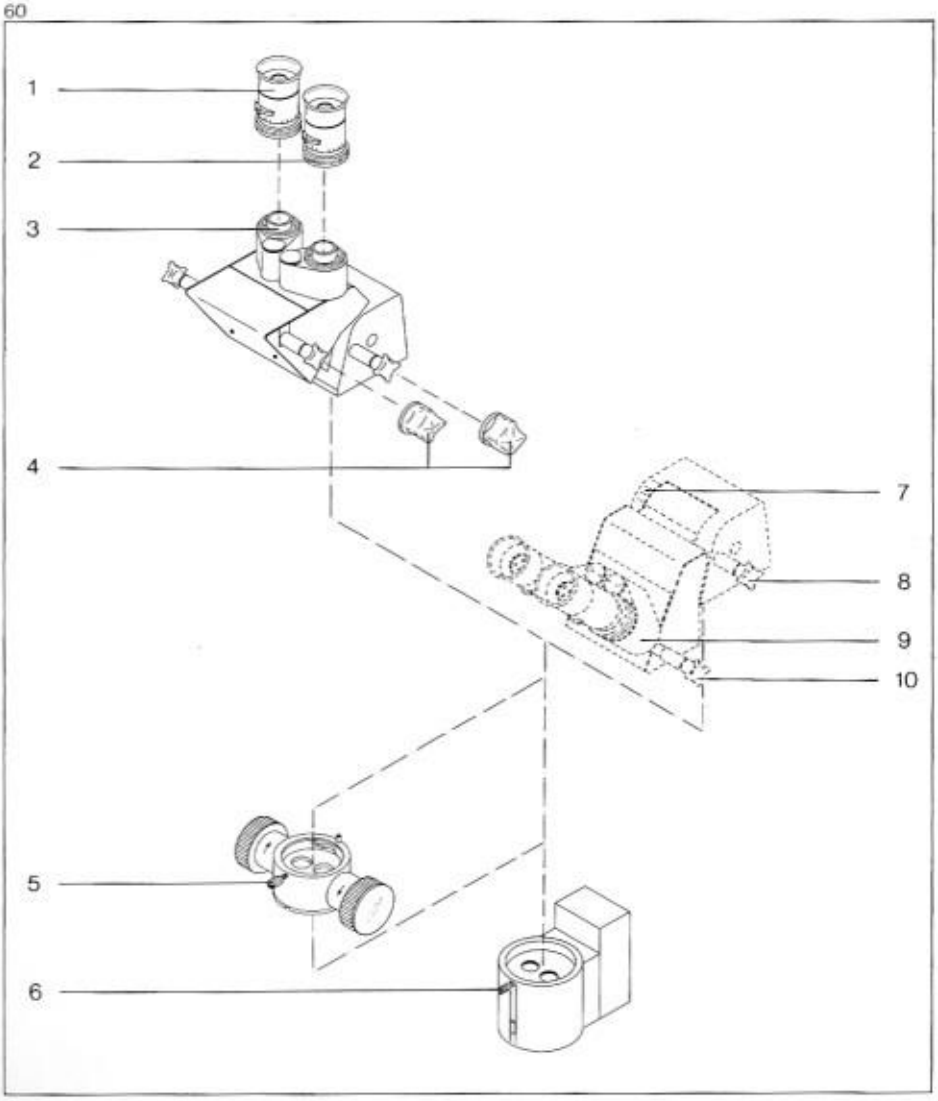
The above modules can be attached to all operation microscopes or beam splitters described. More details are given in the corresponding chapters.

58



59

60



Inclinable binocular tube
The inclinable binocular tube can be adapted to all operation microscopes.

Depending on the manufacturing date, microscope and beam splitter have screws with either a M 3.5 or M 4 thread for securing attachment.

Since a special screw is required for securing the inclinable tube, two special screws with M 3.5 and M 4 thread are supplied with each inclinable tube.

Cat. No.: 30 37 76

Screw-in eyepieces for inclinable binocular tube
The screw-in eyepieces can be equipped with micrometer disks.

This must be done either in the factory or by our service technicians.

	Cat. No.
Screw-in eyepieces 12,5x	*30 55 17*
Screw-in eyepieces 20x	*30 55 10*

Mounting and adjustment of the inclinable binocular tube:

- Exchange screw (5) or (6) for special screw required.
- Place inclinable tube on microscope or beam splitter and lock with special screw.
- Slide eyepieces (1) over supports (3) and fasten by turning knurled ring (2) to the right.
- If PD has to be changed with micrometer disks built-in, then they will have to be reoriented. Loosen knurled ring (2) and rotate eyepiece.

Setting the eyepiece is described on p. 72.

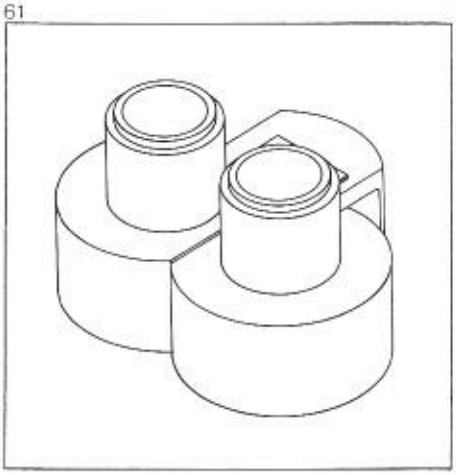
For previous adjustment of the viewing angle scale (7) is graduated in angular degrees.

PD and viewing angle are adjusted as follows:

- Loosen star knob (8) by rotating it counterclockwise, set viewing angle desired and fasten inclinable tube again by clockwise rotation of star knob.
- PD is set by rotating star knob (10) or inclining eyepiece supports (9).

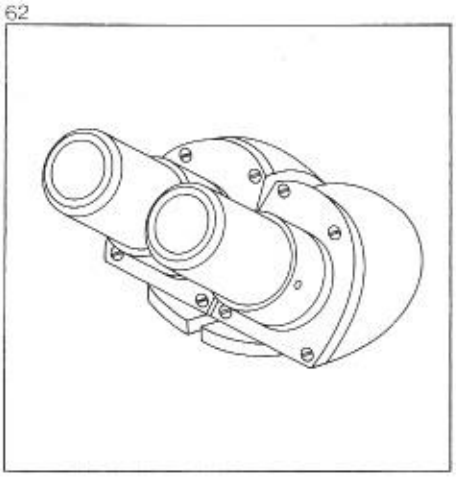
Sterilizable rubber cups (4) *(30 34 18)* can be slid over the star knobs, so that adjustments can be made during surgery.

61



Straight binocular tube f = 125 mm:
The interpupillary distance of the straight tube is set by pulling the two tube halves apart or pressing them together.
Cat. No. 30 37 16

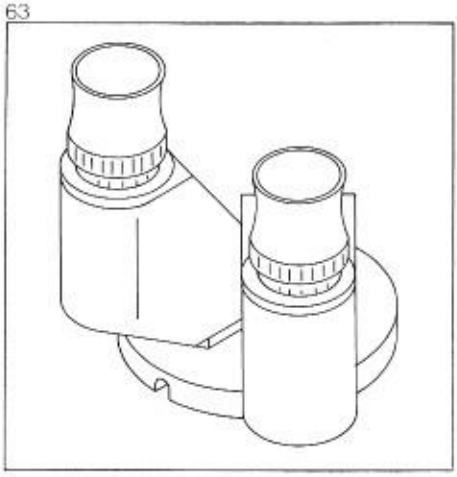
62



Inclined binocular tube f = 125 mm
The interpupillary distance of the inclined binocular tube is set by grasping the eyepiece sleeves as far up as possible and pulling them apart or pressing them together.

The center of rotation of the inclined tube is at the bottom of the prism housing.
Cat. No. 30 37 17

63

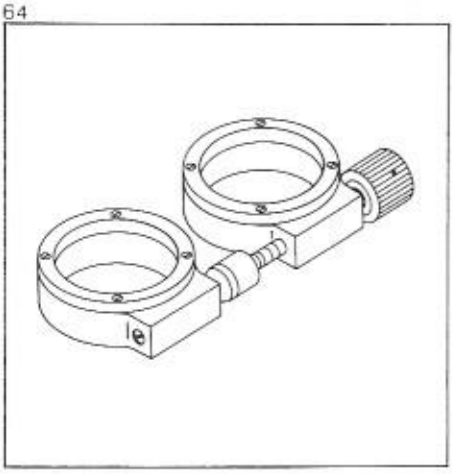


Straight binocular tube f = 80 mm with eyepieces
The eyepieces of the straight tube cannot be exchanged.

For adjustment see "Eyepieces" on p. 72.

Micrometer disks cannot be incorporated.
Cat. No. 30 37 77

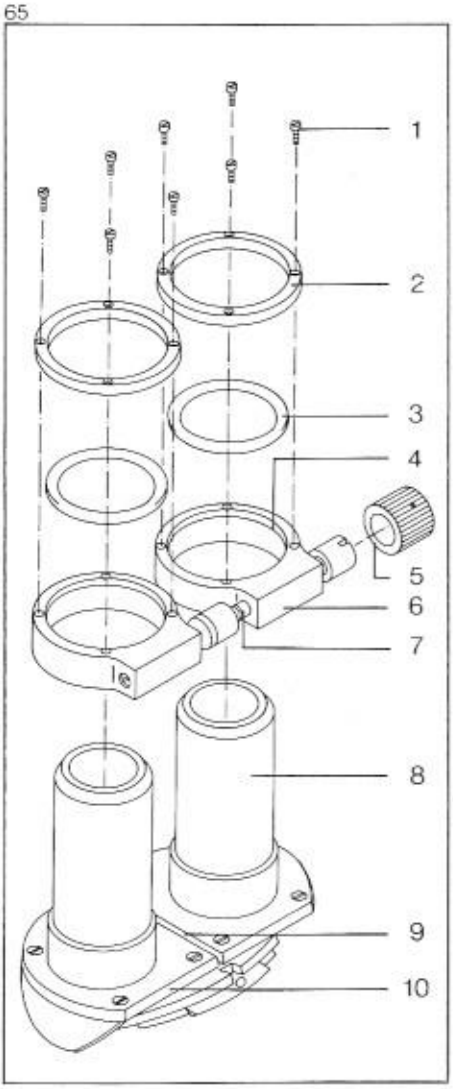
64



PD adjuster
The PD adjuster permits reproducible precision adjustment of the inclined binocular tube to the observer's interpupillary distance. Inadvertent adjustment is impossible.

It can be adapted to inclined binocular tubes f = 125 mm and f = 160 mm.
Cat. No. 303798

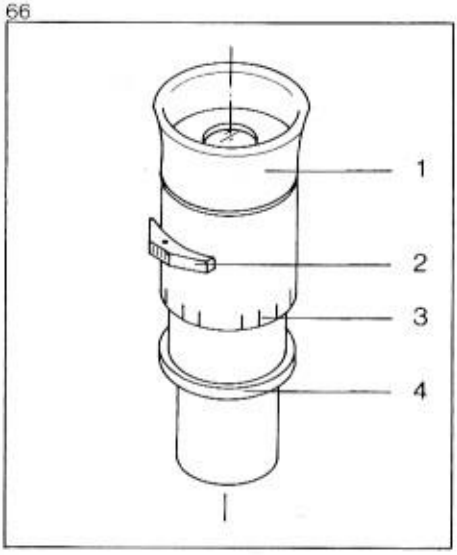
65



Mounting of PD adjuster

- Loosen eight screws (1) and remove both clamp rings (2) and rubber rings (3).
- With knurled knob (5) *(303799)* bring PD adjuster to its narrowest setting.
- Close tube halves (8) right together and then open until the two contact surfaces (9) are 0.2 mm apart. This is necessary for limiting the closing action with the PD adjuster and not with the tube halves.
- Place PD adjuster on tube and align surfaces (6) with front edges (10) of tube.
- Insert rubber rings (3) in inclined surfaces (4), attach clamp rings (2) and tighten uniformly with eight screws (1).
- Black ring (7) indicates the center position of the PD adjuster setting range. The red marks on the left and right of the black ring are for orientation.

66



Eyepiece:
Magnification of the standard eyepiece is 12.5x. Additional eyepieces are available with 10x, 16x and 20x magnification.

Non- spectacle wearers should use the eyepieces with the eyecups turned up.

Spectactle wearers should fold down the eyecups of the eyepieces for observation.

To assure that the correct eyepiece setting remains unchanged, the eyepieces have a locking device controlled by spring-loaded lever (2).

For measurement and as focusing aids the eyepieces are also available with micrometer disks incorporated. Mounting of the disks is to be effected only in the factory or by our service technicians.

The eyepieces with and without micrometer disks differ in their adjustment:

Adjusting the eyepieces without micrometer disks:

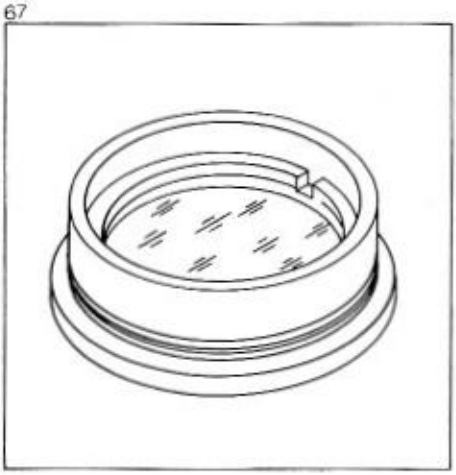
- Slide eyepiece into binocular tube as far as it will go (4).
- Press lever (2). Emmetropes set eyepiece to "0". Ametropes not using their spectacles set their refractive error on the diopter scale.

Adjusting the eyepieces with micrometer disk

- Hold eyepiece against a homogeneously shining background.
- Press lever (2) and fully unscrew eyepiece support with diopter scale by turning counterclockwise.
- Screw back eyepiece by turning clockwise. New look through the eyepiece with perfectly relaxed eye until crosshair of micrometer disk is seen sharply defined. Read value given on diopter scale. Repeat this procedure three times and then set the diopter scale to the average value.

	Cat. No.
Eyepiece 10x	*30 55 11*
Eyepiece 12.5x	*30 55 12*
Eyepiece 16x	*30 55 13*
Eyepiece 20x	*30 55 14*

67

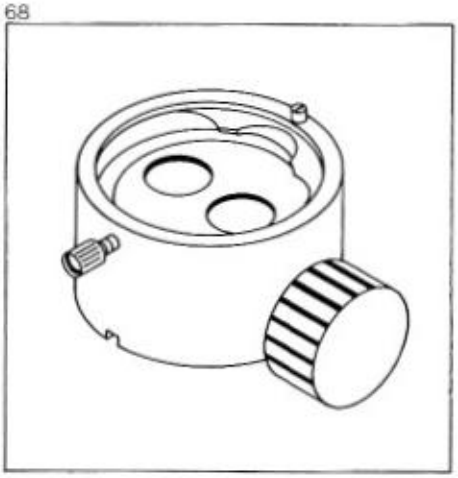


Objetives
Objectives with focal lengths from f = 50 mm to f – 2,000 mm are available.

Focal length of the objectives and working distances correspond approximately to each other. (Objective f = 50 mm has an approximate working distance of 30 mm).

	Cat. No.
f – 50 mm	*305701*
f – 100 mm	*305134*
f = 125 mm	*305131*
f = 150 mm	*305702*
f – 175 mm	*305720*
f – 200 mm	*305132*
f = 225 mm	*305704*
f – 250 mm	*305705*
f – 275 mm	*305706*
f = 300 mm	*305137*
f = 325 mm	*305147*
f – 350 mm	*305707*
f – 375 mm	*305708*
f = 400 mm	*305146*
f = 500 mm	*305133*
f – 800 mm	*305148*
f = 1250 mm	*305149*
f = 2000 mm	*305150*

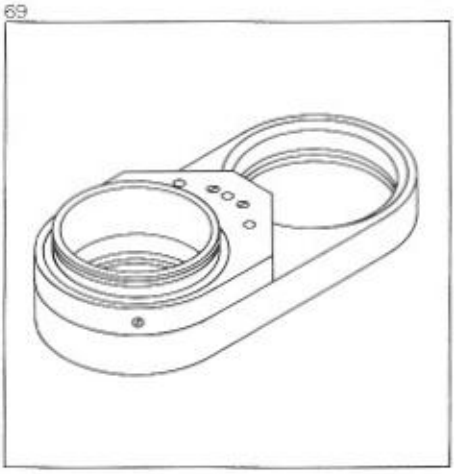
68



Magnification changer
When using carrier for assistant's microscopes *(303570,* Fig. 86 and 8° assistant's microscope, Fig. 79), the magnification changer can be incorporated between carrier and binocular tubes.

With the magnification changer the basic magnification can be changed by the factor 0.6 or 1.6.
Cat. No. 303429

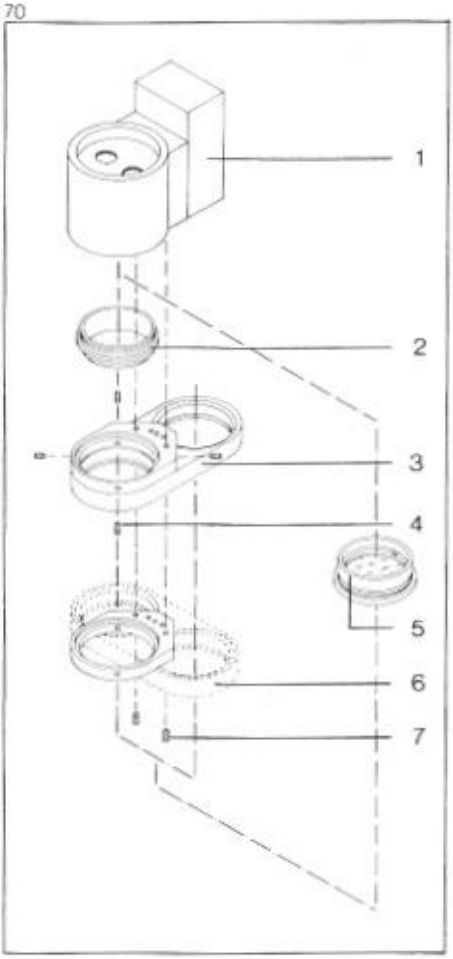
69



Fast objective changer
The fast objective changer can be adapted to all operation microscopes.

Due to reflections the fast objective changer should not be used on microscopes with fiber optics.
Cat. No.: 301621

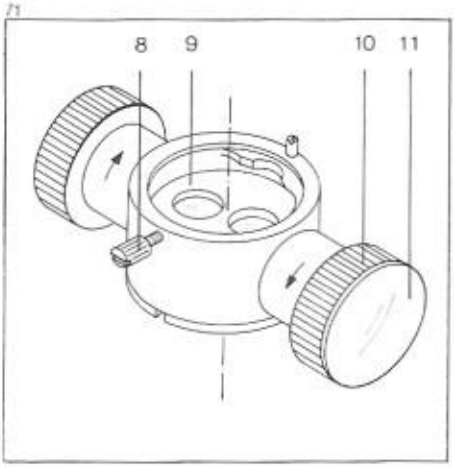
70



Mount fast objective changer as follows:

- Remove objective (5) from microscope.
- Unscrew four grub screws (4) so that mounting ring (2) can be removed from the changer.
- Screw mounting ring (2) into microscope as far as it will go.
- Slide folded changer onto mounting ring.
  Surface (3) of the changer must be parallel with microscope surface (1). Fasten changer on the ring with four grub screws (4).
- Rotate changer through 90° to position (6) shown by the broken lines until it engages.
- Screw in two grub screws (7) tightly to make sure that the changer is kept from inadvertent rotation.
- Screw objectives required into changer.
- The desired objective can now be swung into the beam path and is automatically centered when engaged.

71



Beam splitter
Both sides of the beam splitter (9) are designed to take instruments for observation and coobservation and/or photo, cine and TV work.

Clamp screw (8) locks the binocular tubes.

Caps (11) are held in place by rings (10).

For attaching the accessories to the beam splitter, remove caps by releasing rings rotating them against arrow on the beam splitter.

Rings (10) secure the instruments so that they do not fall out.

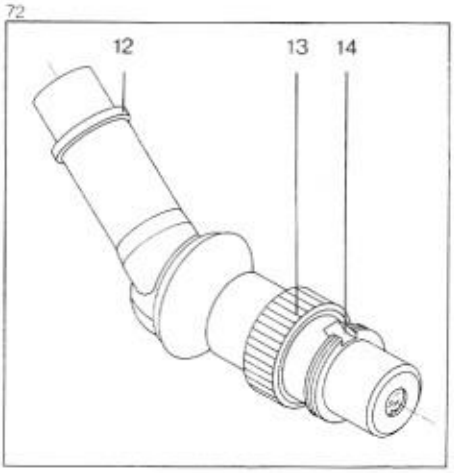
Two beam splitter versions are available:

1. Beam splitter 50:
Mainly used for coobservation.

2. Beam splitter 1:7:
Mainly used for halogen lamp illumination for photo, cine and TV work. Compared to splitter 50, the light beam is split in a ratio of 1:7 and higher by a factor of 1:1.7x.

	Cat. No.
Beam splitter 50	*301513*
Beam splitter 1:7	*301591*

72



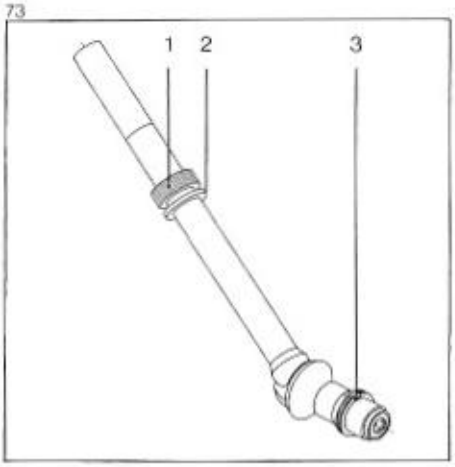
Short coobservation tube
The short coobservation tube is used for monocular coobservation.

The viewing angle can be adjusted by lifting locking sleeve (12).

Image erection is obtained by rotating knurled ring (13).

Centering groove (14) is guided in the beam splitter.
Cat. No. 305173

73



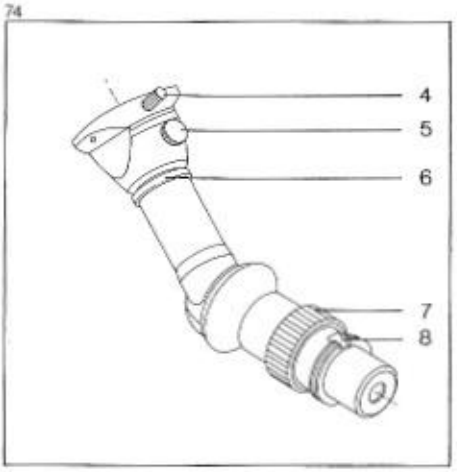
Long coobservation tube
The long coobservation tube is used for monocular coobservation.

The viewing angle can be adjusted by lifting locking sleeve (2).

Image erection is obtained by rotating knurled ring (1).

Centering groove (3) is guided in the beam splitter.
Cat. No. 305143

74



Assistant's stereo tube
The assistant's stereo tube accepts all binocular tubes.

Lifting locking sleeve (6) adjusts the viewing angle.

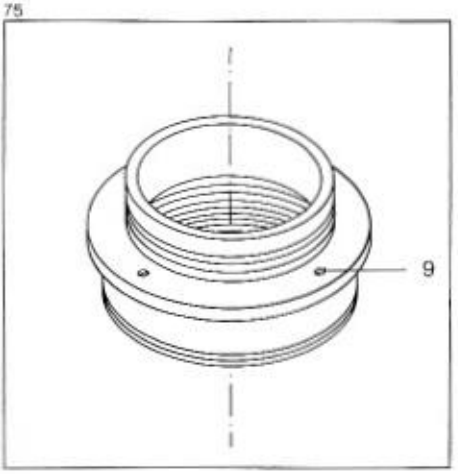
Image erection is obtained by rotating knurled ring (7).

Centering groove (8) is guided in the beam splitter.

With screw (5) released the tube accommodation can be rotated about its optical axis.

Screw (4) locks the binocular tubes.
Cat. No. 305174

75

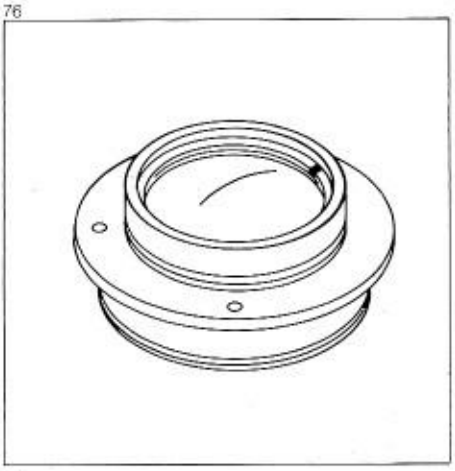


Mounting ring
The mounting ring takes different accessories for observation and coobservation.

The objective is screwed into the interior thread of the mounting ring.

The two grub screws (9) prevent twisting of the mounting ring in the objective thread.
Cat. No. 303629

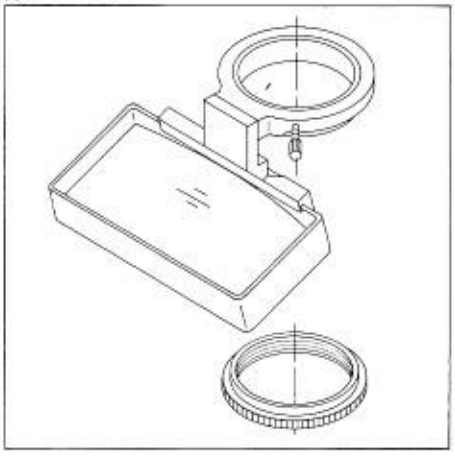
76



Mounting ring with in-base objective
Accessories with fixed optical planes such as slit illuminators and surgical slit illuminators require the microscope objective to be mounted in its orginal position.

	Cat. No.
f = 150 mm	*303551*
f = 175 mm	*303552*
f = 200 mm	*303553*

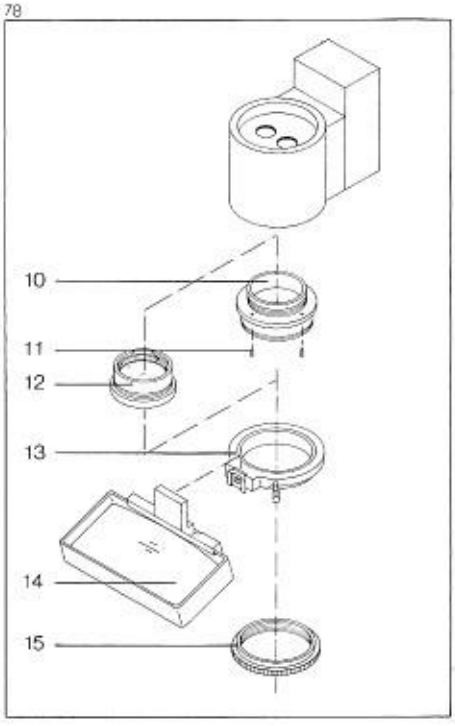
77



2x magnifier
The magnifier is designed for observing objects without the microscope.

The magnifier is rotatable about the microscope's optical axis and can be locked in place by the knurled screw.
Cat. No.: 303566

78



Mount 2x magnifier as follows:

- Remove objective (12) from microscope and screw mounting ring (10) into microscope thread.
- Keep mounting ring (10) from twisting by screwing two grub screws (11) into microscope body.
- Screw objective (12) back into mounting ring (10) as far as it will go.
- Slide ring (13) onto mounting ring (10) Secure ring (13) by attaching knurled ring (15).
- Magnifier (14) can now be mounted on dovetail guide of ring (13).

79

8° assistant's microscope
Screw (1) clamps the binocular tube.

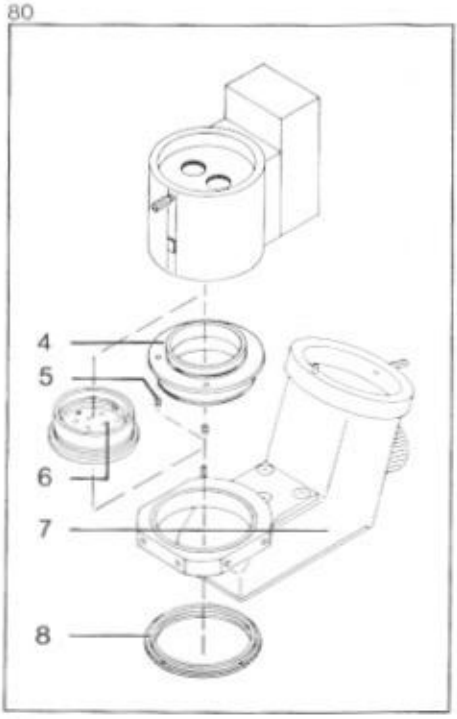
Upper part (2) with binocular tube mounted is rotatable for observation and rests in any position desired without clamping.

Adjusting knob (3) focuses the objective.

The focal lengths of the assistant's microscope must be identical with that of the main objective.

	Cat. No.
f = 150 mm	*303581*
f = 175 mm	*303582*
f = 200 mm	*303583*
f = 250 mm	303585
f = 300 mm	*303587*

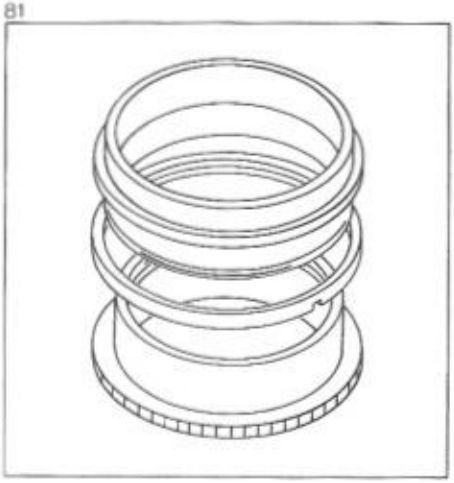
80



Mounting the 8° assistant's microscope

- Remove objective (6) from the microscope and screw mounting ring (4) into thread of microscope body as far as it will go.
- Keep mounting ring from twisting by screwing grub screws (5) into microscope body.
- Screw objective (6) back into mounting ring (4) as far as it will go.
- Slide 8° assistant's microscope (7) onto mounting ring and secure with ring (8).
- The binocular tube can now be placed on 8° assistant's microscope.

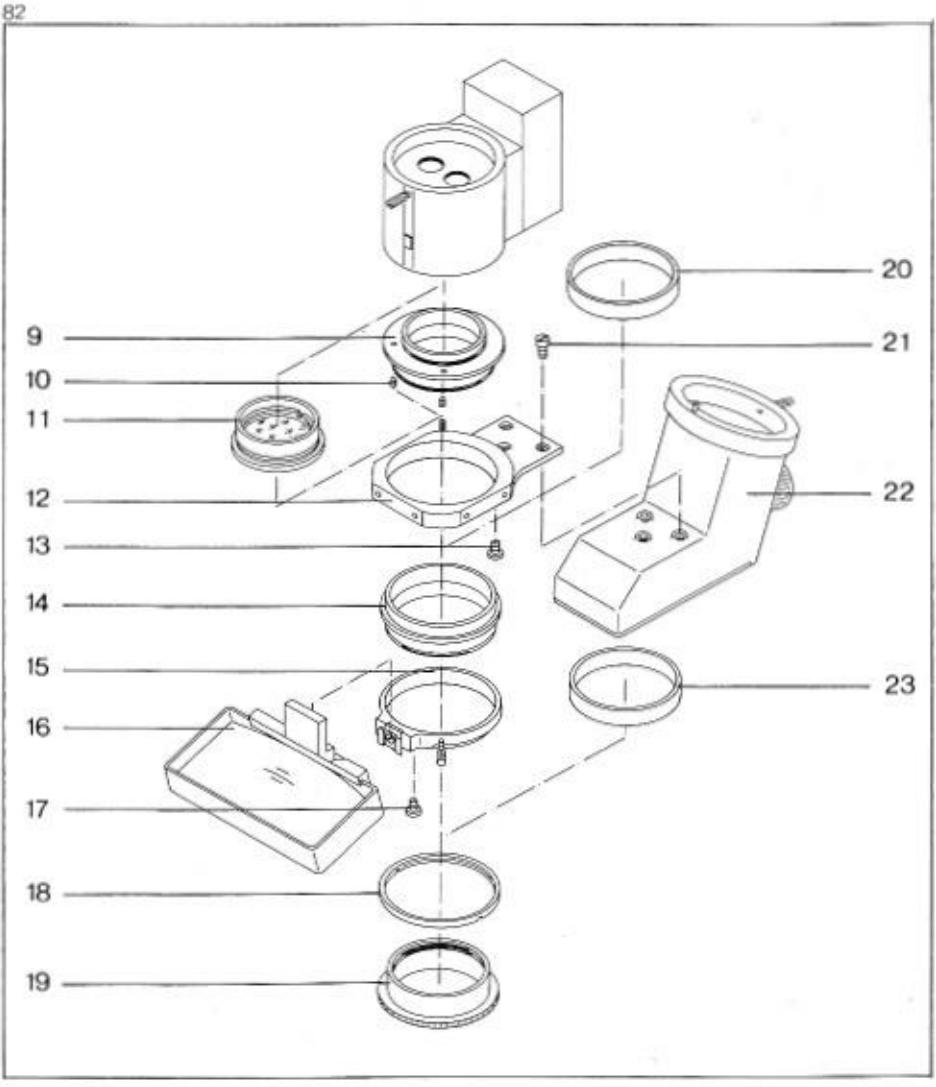
81



Double mounting ring
This mounting ring takes two modules. All accessories suited for the single mounting ring can be attached on either side. The single mounting ring is also required for mounting.

Since hints have already been given on adjustment of the modules with the single mounting ring, here only an example is given that can be applied to all attachments.
Cat. No. 303614

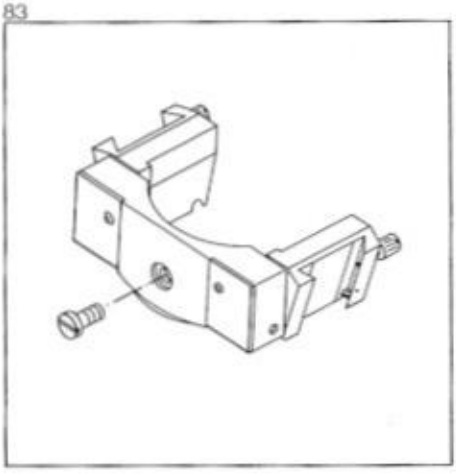
82



Mounting of 8° assistant's microscope and 2x magnifier:

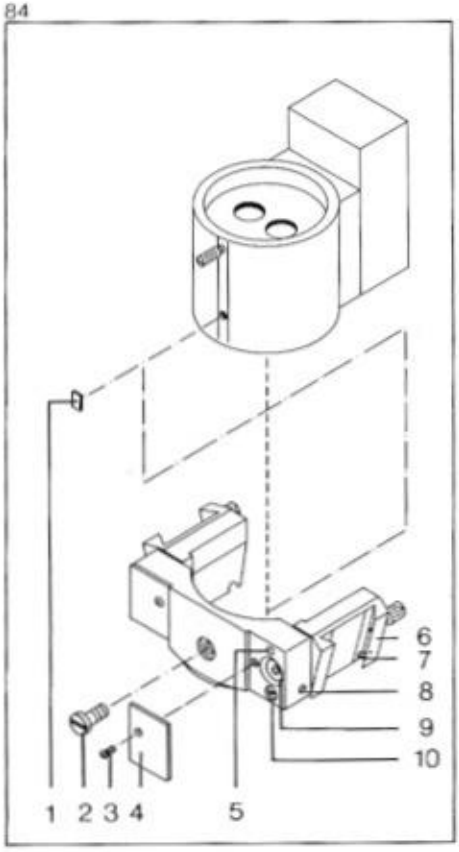
- Remove objective (11) from microscope and screw mounting ring (9) into thread of microscope carrier as far as it will go.
- Keep mounting ring (9) from twisting by screwing two grub screws (10) into microscope body.
- Screw objective (11) back into mounting ring (9) as far as it will go.
- Unscrew three screws (21) and take off plate (12) from assistant's microscope (22).
- Unscrew screws (13) and (17) and remove rings (20) and (23).
- Place plate (12) and ring (15) onto double mounting ring (14). Slide both on mounting ring (9). Screw in ring (18) as far as it will go and attach ring (19).
- Attach assistant's microscope (22) with three screws (21) to plate (12).
- Place binocular tube or magnification changer with binocular tube onto 8° assistant's microscope. Slide eyepieces into binocular tube as far as they will go. Mount magnifier (16) onto dovetail guide of holder (15).

83



Universal carrier
The dovetail mounts of the Universal carrier take illuminator carrier *30 34 21*, Fig. 85 or carrier for assistant's microscope *30 35 70*, Fig. 86.
Cat. No. 30 35 69

84



Mounting the Universal carrier on the microscope:

- Remove cover (1) from microscope
- Slide Universal carrier from below onto microscope body and tighten with screw (2).

The following adjustments can be made:

Stop screw (7) is for height adjustment of the module fixed to the dovetail guide. Screw (6) locks this stop screw.

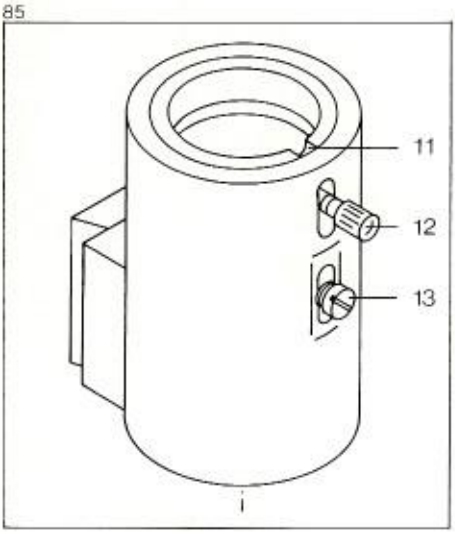
For further adjustment, remove screw (3) and take off lid (4); release screw (9) which must be tightened after adjustment.

By rotating screw (5) the module can be tilted forwards.

By rotating eccentric screw (10) the module can be tilted to the side.

Screw (8) locks eccentric screw (10).

85



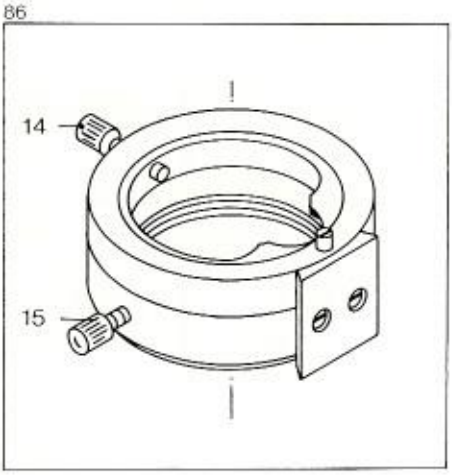
Illuminator carrier for Universal carrier
The illuminator carrier accepts the homogeneous illuminator or slit illuminator.

The centering pin of the surgical slit illuminator must engage in groove (11).

Screw (12) locks the surgical slit illuminator or homogeneous illuminator.

With screw (13) released, the slit illuminator can be focused.
Cat. No.: 30 34 21

86

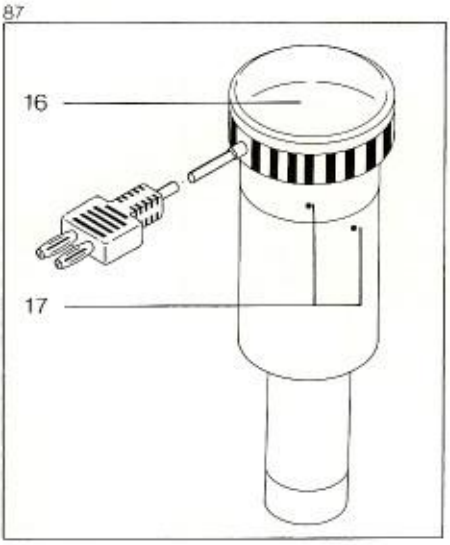


Carrier for assistant's microscope
The focal length of the assistant's microscope objective must be 25 mm longer than that of the main objective, so that the distances of main and assistant's microscopes to the object are about the same.

Screw (14) clamps binocular tubes or magnification changer.

Screw (15) locks viewing position.
Cat. No. 30 35 70

87



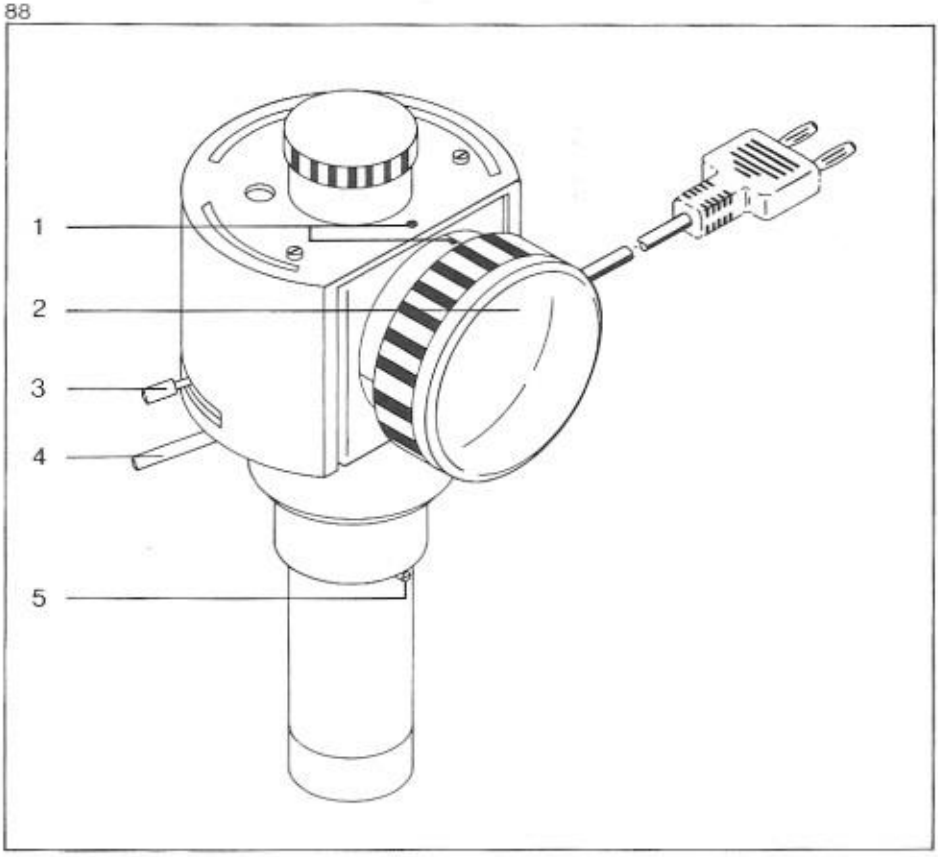
Homogeneous illuminator
The homogeneous illuminator can be mounted on illuminator carrier *30 34 21*, Fig. 85, on illuminator carrier *30 34 08*, Fig. 92, or on illuminator carrier *30 34 09*, Fig. 93, if the latter is mounted together with *30 34 08*.

The lamp is exchanged as follows:

- Turn lamp cap (16) until dots (17) are opposite and take off lamp cap.
- Replace lamp (6 V 30 W/*39 01 58*). Caution: Lamp flange must rest in the recess provided.
- Place lamp cap and rotate until it engages.

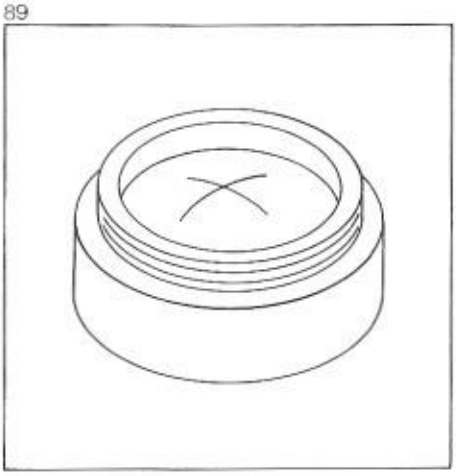
Cat. No. 30 81 13

88



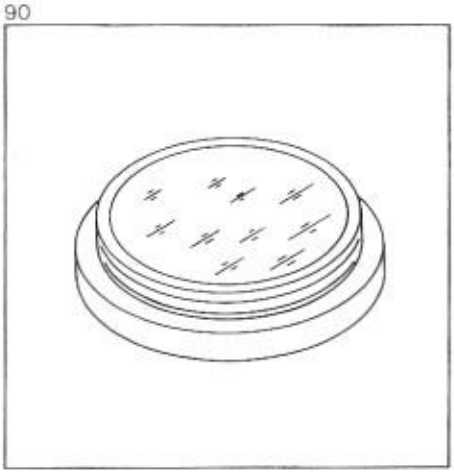
Slit illuminator

89



Illuminator objectives

90



Supplementary lenses

Slit illuminator
The slit illuminator can be mounted on illuminator carrier *30 34 21*, Fig. 85, illuminator carrier *30 34 08*, Fig. 92 or illuminator carrier *30 34 09*, Fig. 93, if the latter is mounted together with *30 34 08*.

Centering pin (5) must be placed into recess of illuminator carrier. Lever (3) adjusts slit height.

Lever (4) adjusts slit width.

The slit illuminator has a 90° catch. Thus the slit position can be inclined four times by 90° each.

Exchange lamp as follows:

- Rotate lamp cap (2) until two dots (1) are opposite and take off lamp cap.
- Press lamp (6 V 25 W/*39 01 53*) against centering mount and turn counterclockwise, withdraw from lamp cap. Press new lamp into centering mount and turn clockwise up to the stop.
- Replace lamp cap and rotate until it engages.

Cat. No. 30 81 17

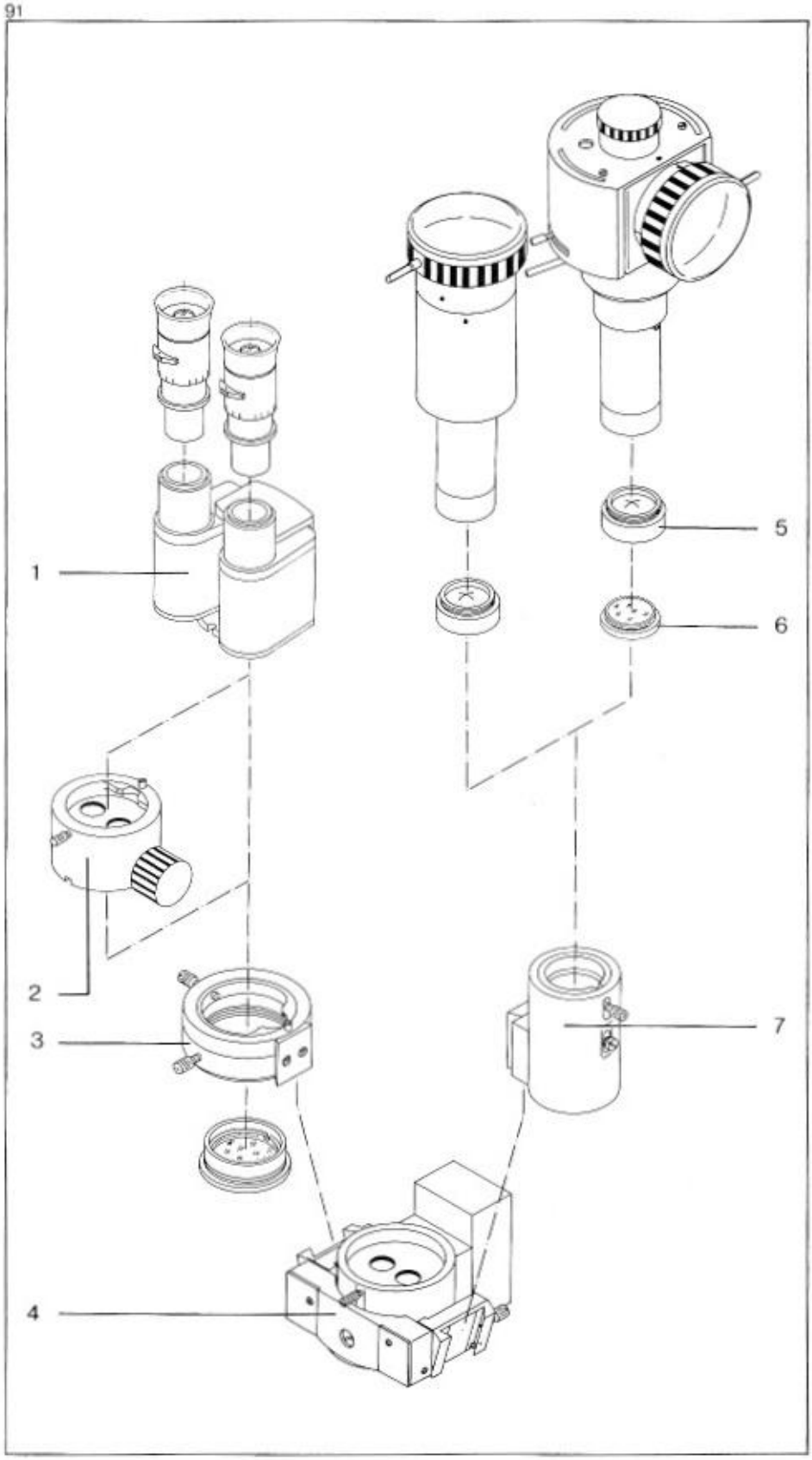
Illuminator objectives
They can adapted to the homogeneous or slit illuminator.

Illuminator objective for	*Cat. No.*
Homogeneous illuminator:	
f = 175 mm	*30 81 23*
Slit illuminator:	
f = 184 mm	*30 81 24*

Supplementary lenses
The supplementary lenses are only used on slit illuminators.

	Cat. No.
Objective f = 150 mm	*30 33 06*
Objective f = 175 mm	*30 33 07*
Objective f = 200 mm	*30 33 08*

91



Hints for mounting the assistant's microscope, slit and homogeneous illuminator

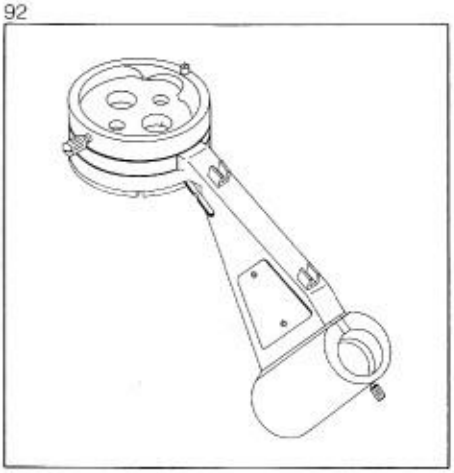
Illuminator carrier (7) and carrier for assistant's microscope (3) can be adapted to either side of Universal carrier (4).

The focal length of the assistant's microscope objective (3) is 25 mm greater than of the main objective, so that the distances of main and assistant's microscopes to the object are about the same.

Magnification changer (2) can be inserted between straight binocular tube (1) (the other tubes of the Med line can also be used) and microscope.

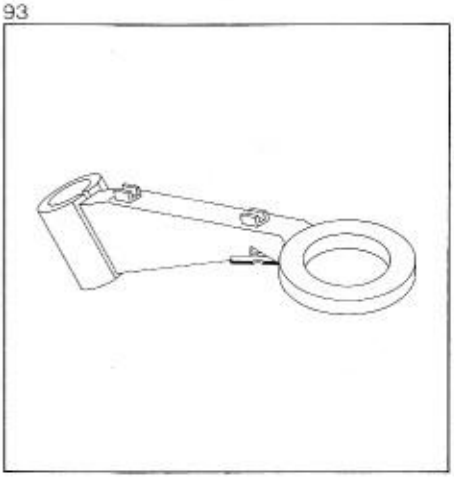
The slit and homogeneous illuminators are equipped with an illuminator objective (5) which is screwed into the illuminator thread.
When using the illuminator objective on the slit illuminator, an additional supplementary lens (6) is to be adapted whose focal length is based on that of the main microscope.

92



Illuminator carrier with adapter *30 34 08*

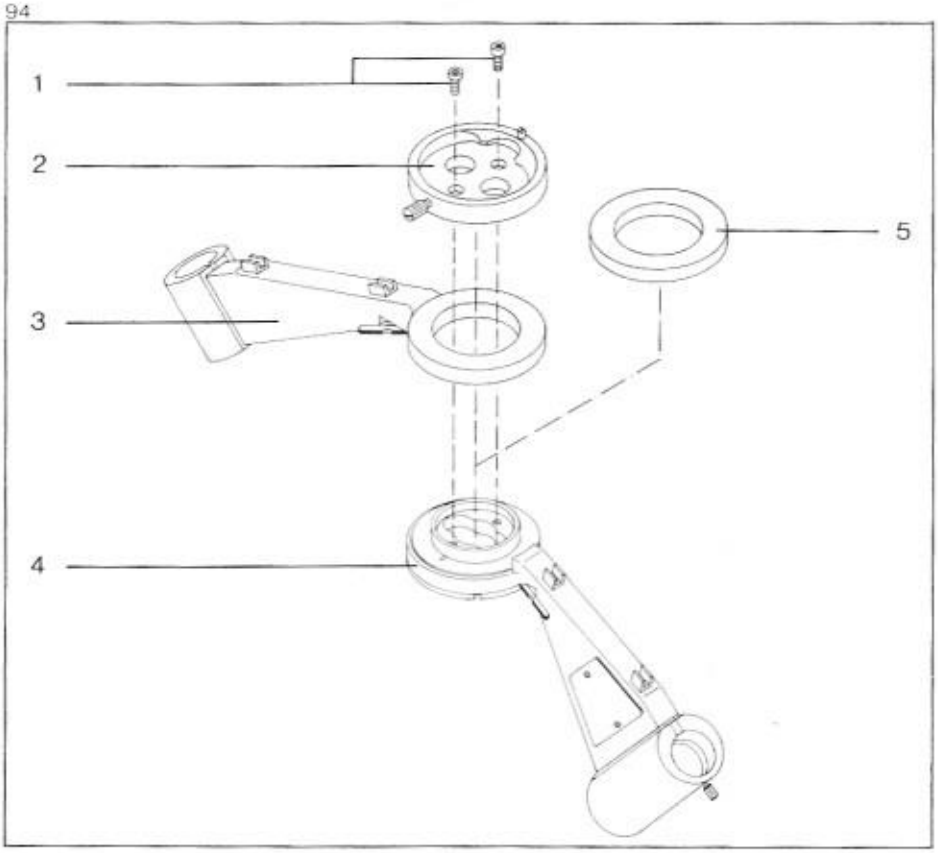
93



Illuminator carrier *30 34 09*

A slit or homogeneous illuminator can be mounted on illuminator carrier of Fig. 92 and then attached to the microscope. Illuminator carrier of Fig. 93 can be combined with illuminator carrier of Fig. 92 to take another slit or homogeneous illuminator. For mounting of the two illuminator carriers, see p.86.

94



Mount illuminator carriers as follows:

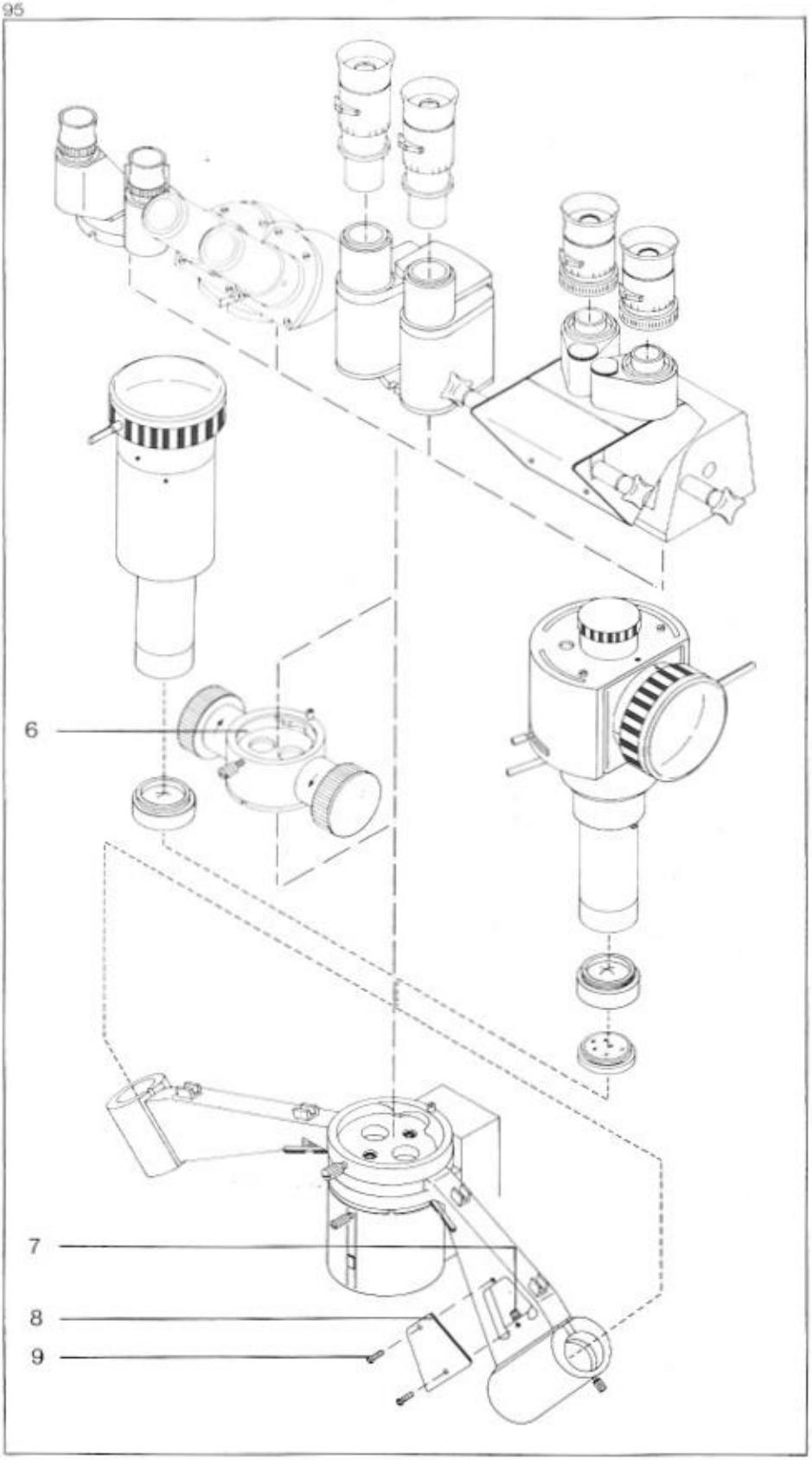
- Unscrew screws (1) and withdraw holder (2) from illuminator carrier (4).
- Remove intermediate ring (5) and replace by illuminator carrier (3).
- Insert holder (2) and attach with two screws (1).

Hints for mounting of slit or homogeneous illuminator on illuminator carrier

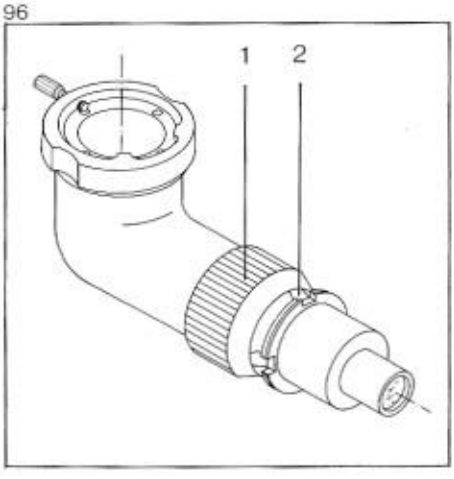
Fig. 95 illustrates the supplements that can be adapted to the illuminator carrier.

For adjustment of the slit or homogeneous illuminator unscrew screw (9), remove plate (8) and turn screw (7) for adjustment.

The beam splitter can be inserted between the binocular tubes and the illuminator carrier.


95
6
7
8
9

96



220 mm photographic adapter
Diaphragm ring (1) is for manual adjustment of the diaphragm.

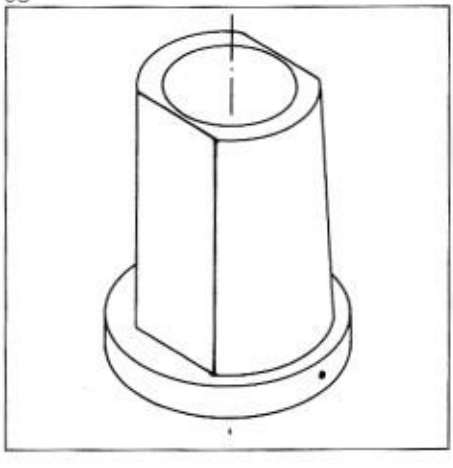
The four centering grooves (2) are located 90° to each other allowing the photographic adapter to be inserted in the beam splitter in four different positions.
Cat. No. 30 15 12

97

Objective 2x or 1.6x
This objective is required for making full use of the 24 x 36 mm film format.

	Cat. No.
Objective 1.6x	*30 16 68*
Objective 2.0x	*30 15 69*

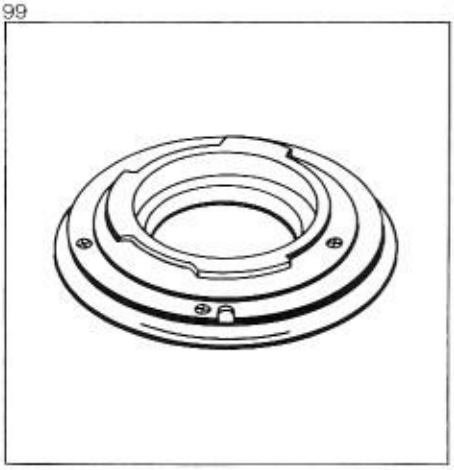
98



30° funnel stop
The 30° funnel stop is required when doing photographic work without supplementary objective 1.6x or 2x.

The 30° funnel stop gives a clearly defined image diameter of 22.5 mm.
Cat. No. 30 15 64

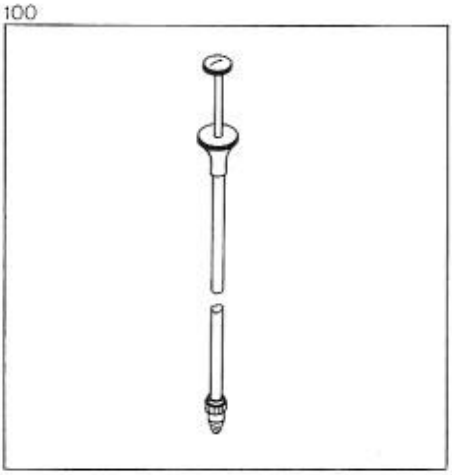
99



Intermediate piece
Each 35 mm camera requires a special intermediate piece.

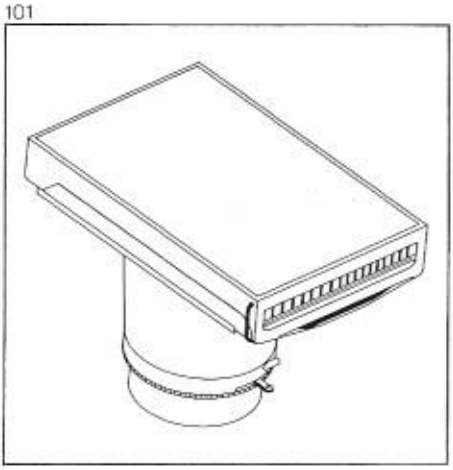
Intermediate piece for 35 mm camera	*Cat. No.*
Pentax	301641
Contax RTS	*301640*
Nikon	*301577*

100



Wire release
The 35 mm cameras are usually delivered with a commercially available wire release.

101



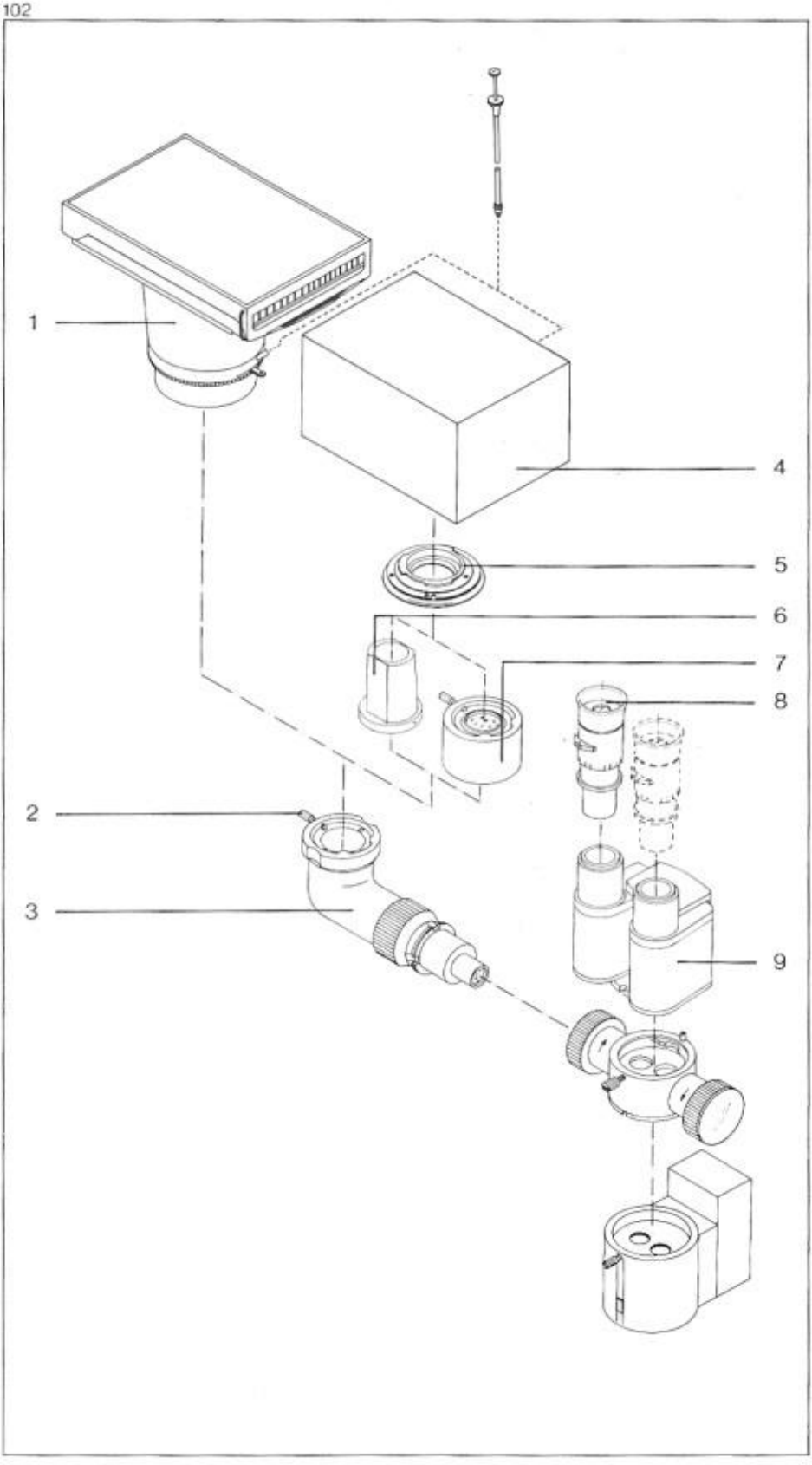
Polaroid camera
The 35 mm camera can be substituted by a Polaroid adapter. Magnification is greater by the factor 3.2 than with the 35 mm camera without supplementary objective.

Image diameter is 73 mm on a film size of 82.5 x 109 mm

A Polaroid packfilm is used.

Black-and white: Type 667 3,000 ASA
Farbe: Type 668 75 ASA
Cat. No. 301622

102



Hints for using the Polaroid or 35 mm camera on the photographic adapter
Place the Polaroid camera on the photographic adapter (3) without using intermediate piece and clamp with screw (2).

Our delivery program offers Polaroid camera *30 16 22.*
Cameras of different brands cannot be adapted because camera and photographic adapter are made to match.

When using a 35 mm camera (4) a special intermediate piece (5) is required for each camera.

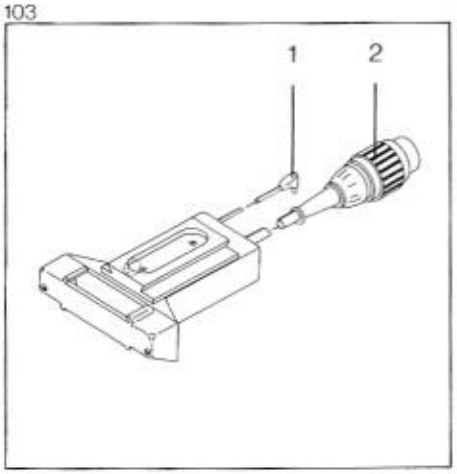
For 35 mm photography, we offer the **Asahi Pentax K 1000,** *Cat. No. 30 16 30* with intermediate piece,
Cat. No. 30 16 41.

Supplementary objective 1.6x or 2.x (7) can be mounted between photographic adapter and intermediate piece, as required. When not using the supplementary objective, 30° funnel stop (6) *(30 15 64)* must be adapted, giving a clearly defined image diameter of 22.5 mm.

The eyepiece (8) with crossline and format limitation is mounted on the camera side of the binocular tube (9). Since crossline and film plane are conjugated, the film image is focused through the eyepiece.

The camera should always be operated via the wire release.

103



Electronic flash
The electronic flash plug (1) is plugged into the 35 mm camera.

Plug (2) connects to outlet for electronic flash in the stand. Should no outlet be provided, power supply unit *309658* (see Fig. 27, p. 30) is required.

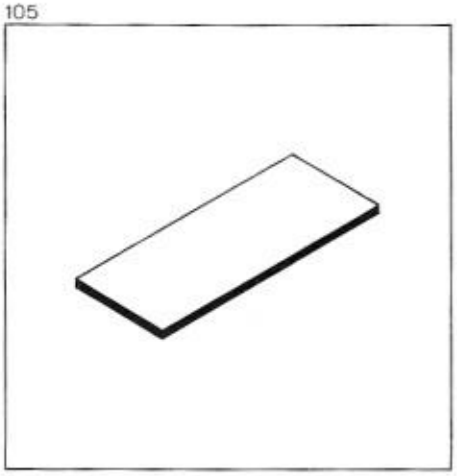
The electronic flash must always be equipped with a plane reflector. An inclined reflector can be added.

Operation microscopes without dovetail for taking the electronic flash require electronic flash holder *303615*.

104

Electronic flash holder
The electronic flash holder is required for microscopes without dovetail mount.
Cat. No. 303615

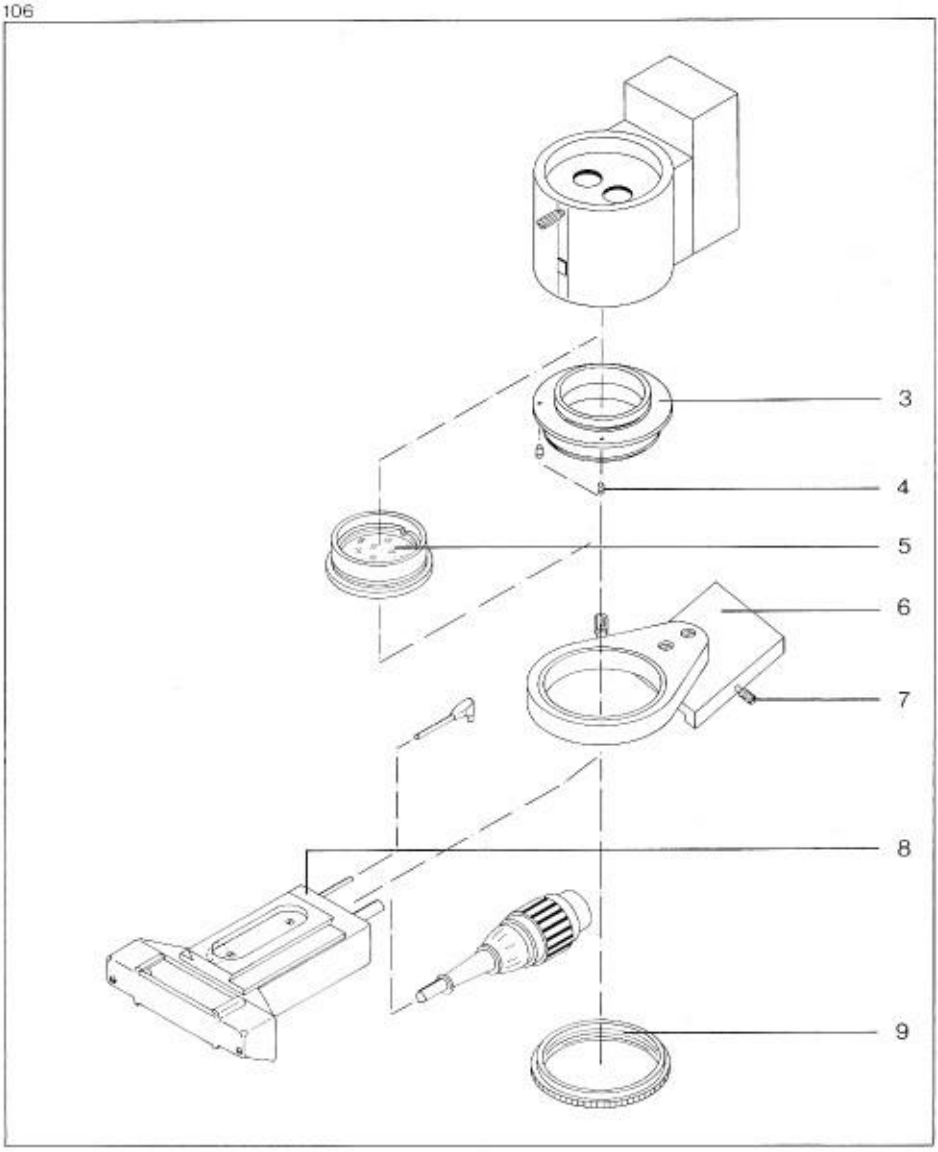
105



Reflector
Electronic flash head *308108*, equipped with a plane reflector, also takes an additional angle reflector.

	Cat. No.
Plane reflector	*308136*
Angle reflector	*308138*

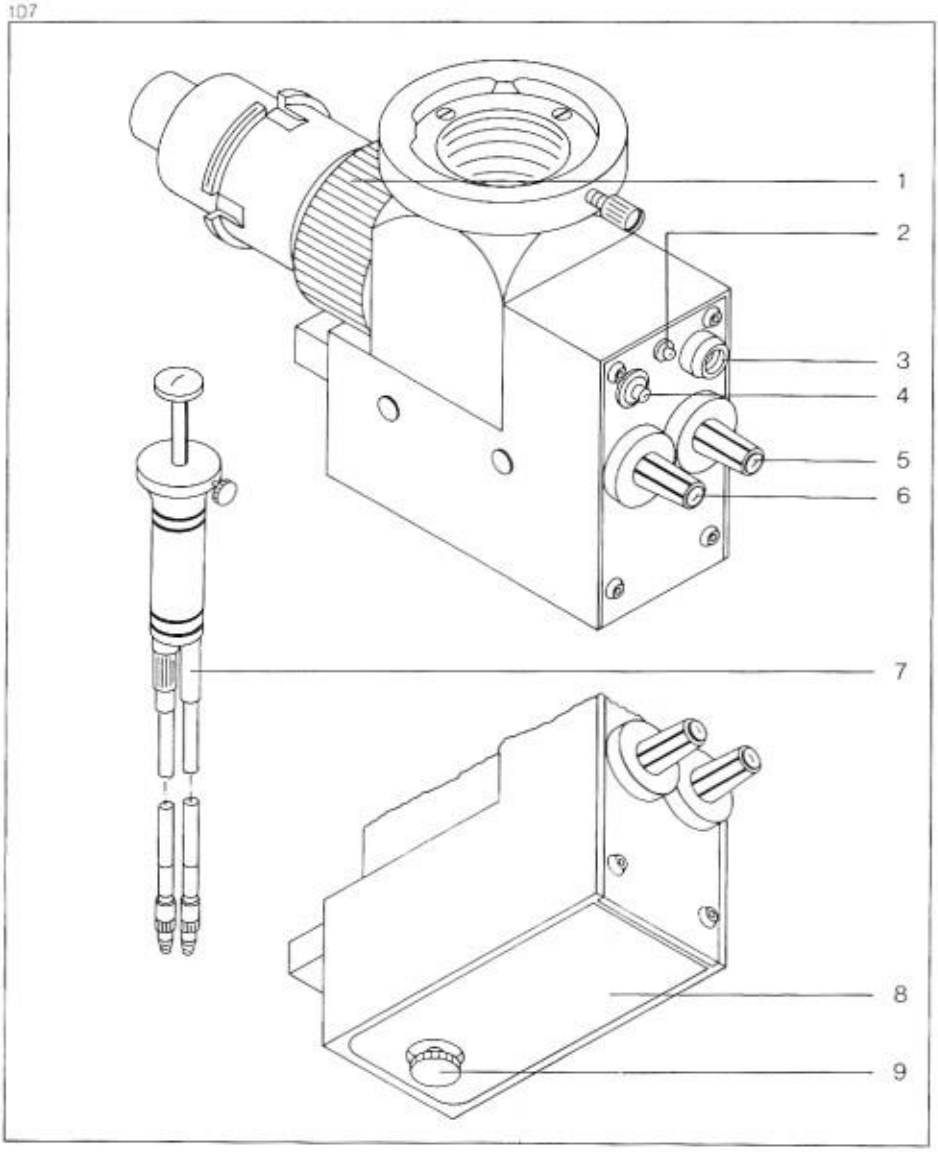
106



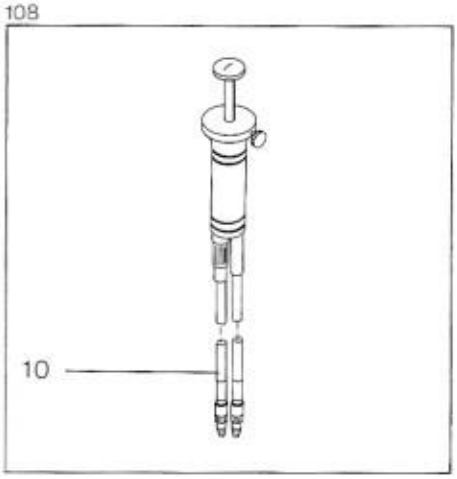
Flash holder and flash head are mounted as follows:

- Remove objective (5) from microscope and screw mounting ring (3) into thread of microscope body as far as it will go.
- Keep mounting ring from twisting by screwing two grub screws (4) into microscope body and screw objetive (5) back in up to the stop.
- Slide carrier (6) onto mounting ring and secure with screw (7).
- Slide flash holder (6) onto mounting ring and secure with ring (9).
- Slide flash head (8) into flash holder and secure with screw (7).
- Establish electrical connections of electronic flash.

107



108



Photographic adapter with automatic diaphragm setting (battery-powered)

● Loosen screw (9) and remove cover (8). The batteries are now accessible. (Duracell 5.4 TR-134 N Mallory, *Cat. No. 380121–9440).*

● When inserting new batteries verify correct + and – connections.

● Knob (6) sets the exposure time from 1 sec. to 1/30 sec.

● Exposure time of photographic adapter must be the same as of camera.

● Knob (5) sets ASA value of the film used.

Inner black scale:
No auxiliary objetive is used.

Outer red scale:
Auxiliary objective 2x is used.

● **Note:**
When using magnification attachment 1.6x *(301668)* always set half the ASA value of the film used on the inner black scale.

● Diaphragm ring (1) indicates the automatically set f-number. If need be (battery too low) the f-number can also be set manually.

● A photodiode, incorporated in the photographic adapter, automatically adjusts the diaphragm.

● Pressing button (4) lights up pilot light (2) if battery capacity is sufficient.

● Jack (3) takes outlet for twin-wire release (7). Delivery of the photographic adapter includes the twin-wire release (7) *(301596).*
Cat. No. 301612

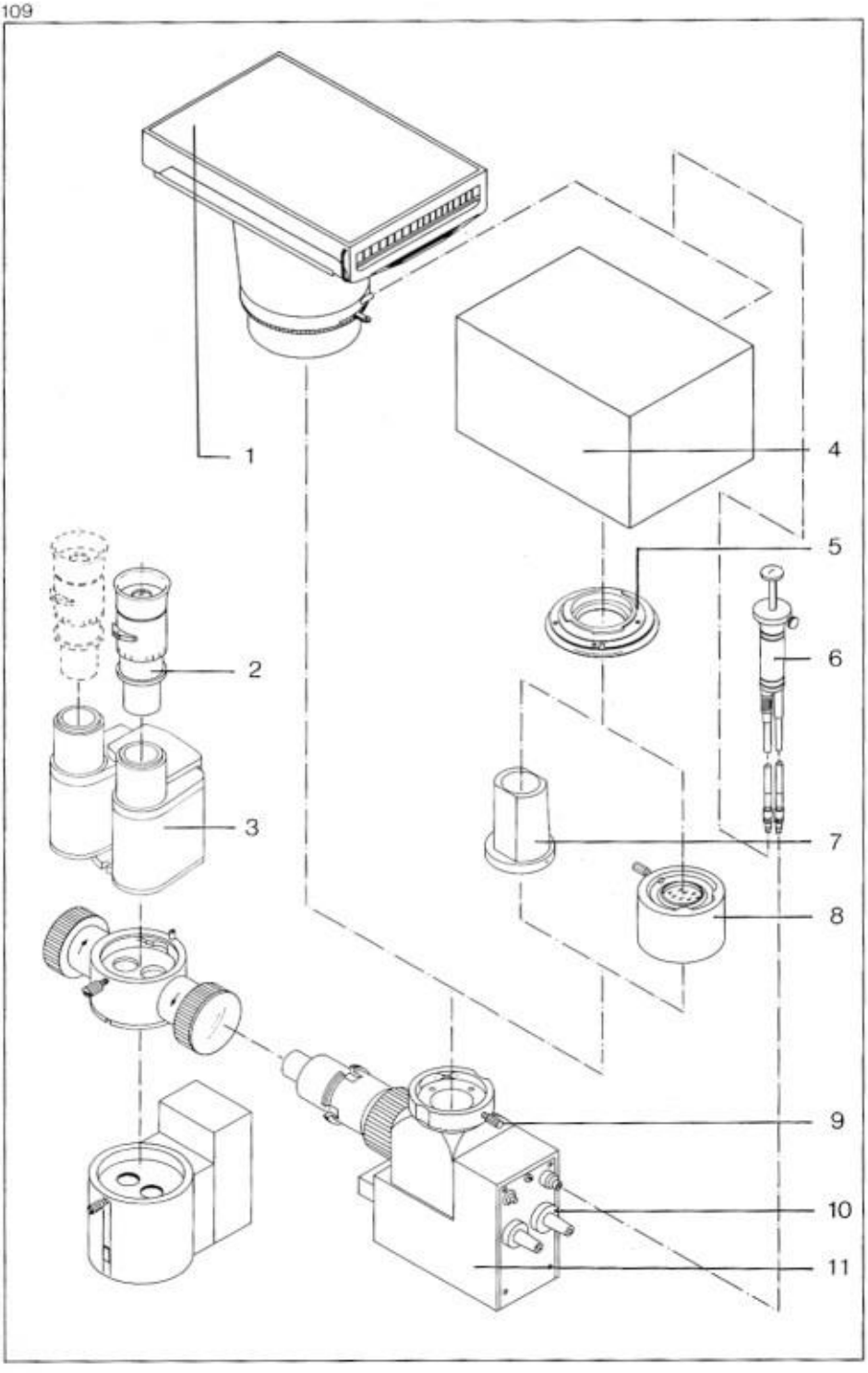
Twin-wire release

The twin-wire release has two release pins. The length of one pin can be adjusted.

Connect as follows:

● Screw adjustable pin (10) into Polaroid or 35 mm camera. Set release in such a way that first the diaphragm of the photographic adapter is actuated, and then, with a short delay, the camera.
Cat. No. 301596

109



Hints for using the Polaroid or 35 mm camera on the photographic adapter with automatic diaphragm setting (battery-powered)

Place Polaroid camera on photographic adapter (11) without intermediate piece and lock with screw (9).

Our delivery program offers Polaroid camera *30 16 22*. Cameras of different brands cannot be adapted because camera and photographic adapter are made to match.

When using a 35 mm camera (4) a special intermediate piece (5) is required for each camera type.

For 35 mm photography we offer the **Asahi-Pentax K 1000,** *Cat. No. 30 16 30* with special intermediate piece *Cat. No. 30 16 41.*

Auxiliary objective 2x or magnification attachment 1.6x can be mounted between photographic adapter and intermediate piece. When using 1.6x magnification attachment half the ASA-value of the film used must always be set on the black inside scale (10). 30° funnel stop (6) *(30 15 64)* must be used when not using the auxiliary objectives. This gives a clearly defined image diameter of 22.5 mm.

Eyepiece (2) with crossline and format limitation is mounted on the camera side of straight or inclined binocular tube (3). Since crossline and film planes are conjugated the film image is focused through the eyepiece.

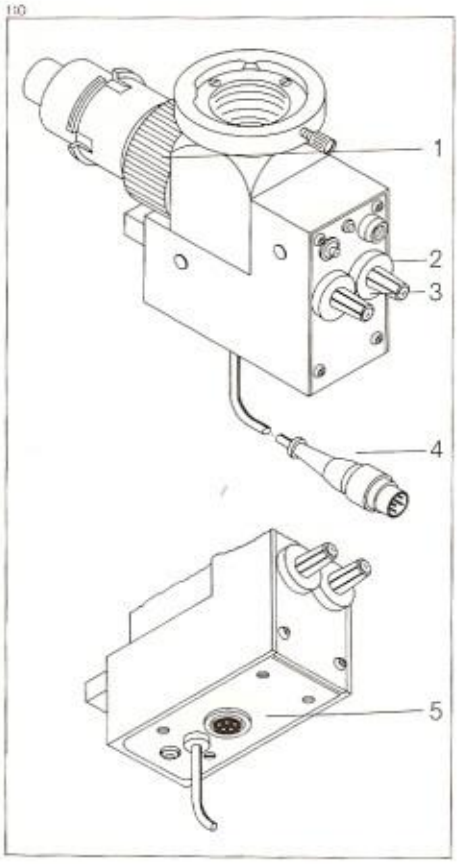
Twin-wire release (6) has two release pins, one of which is adjustable in length.

Connect as follows:

Screw adjustable release pin (6) into Polaroid or 35 mm camera.

Set release in such a way that first the diaphragm of the photographic adapter is actuated and then, with a short delay, the camera.

The release system must be manually cocked and released.



Photographic adapter with automatic diaphragm setting and delayed release (operated by stand's electrical assembly group):

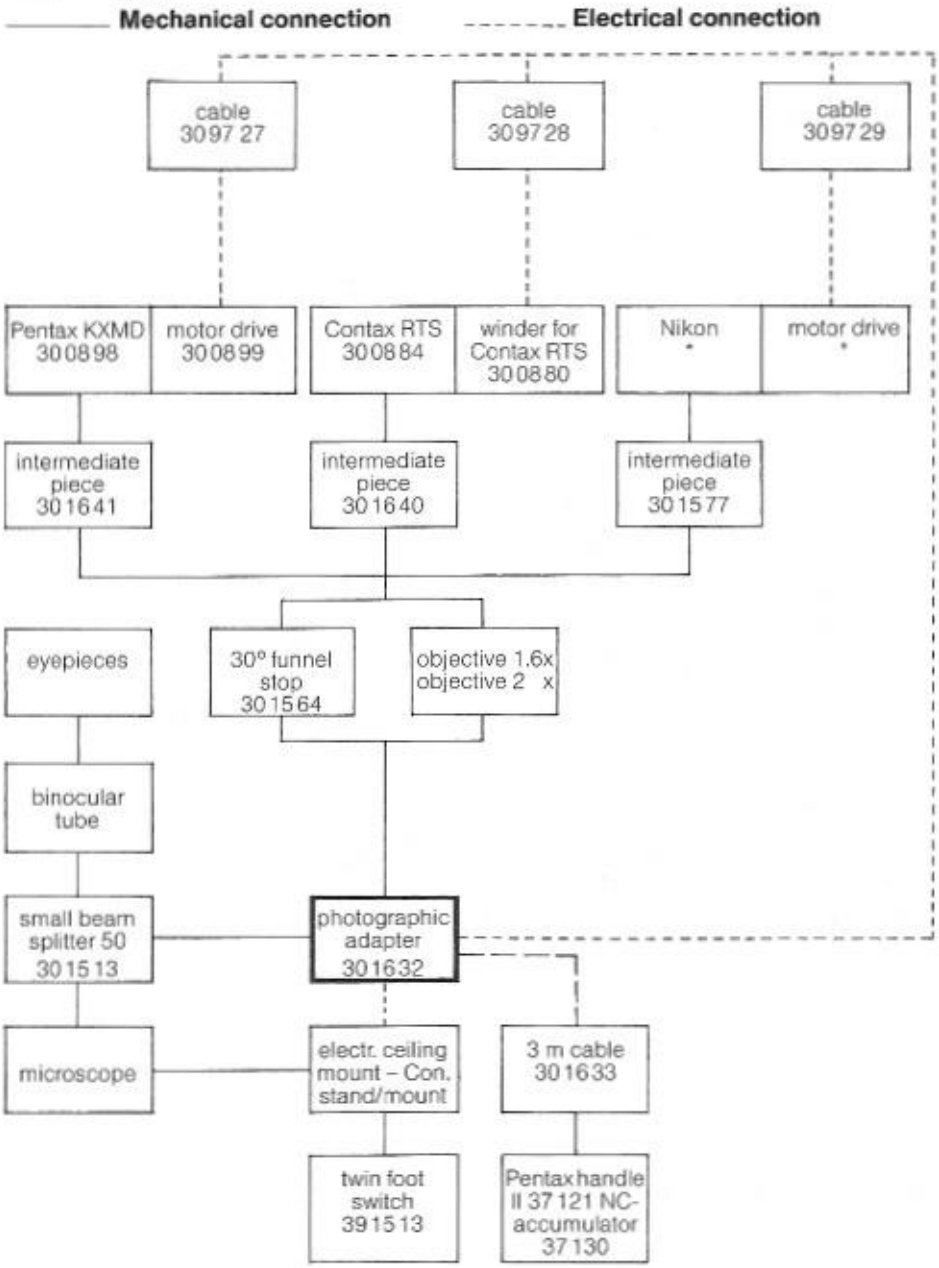
Older stand versions do not have an outlet for power supply of photographic adapter *30 16 32*, so that a handle with in-base NC-accumulator is required.

- Knob (3) sets exposure time, ranging from 1 sec. to 1/30 sec.
- Exposure time of photographic adapter must be the same as of camera.
- Knob (2) sets ASA value of the film used.
  Inner black scale:
  No auxiliary objective is used.
  Outer red scale:
  Auxiliary objective 2x is used.

Note:
When using magnification attachment 1.6x *(30 16 68)*, always set half the ASA value of the film used on the inner black scale.

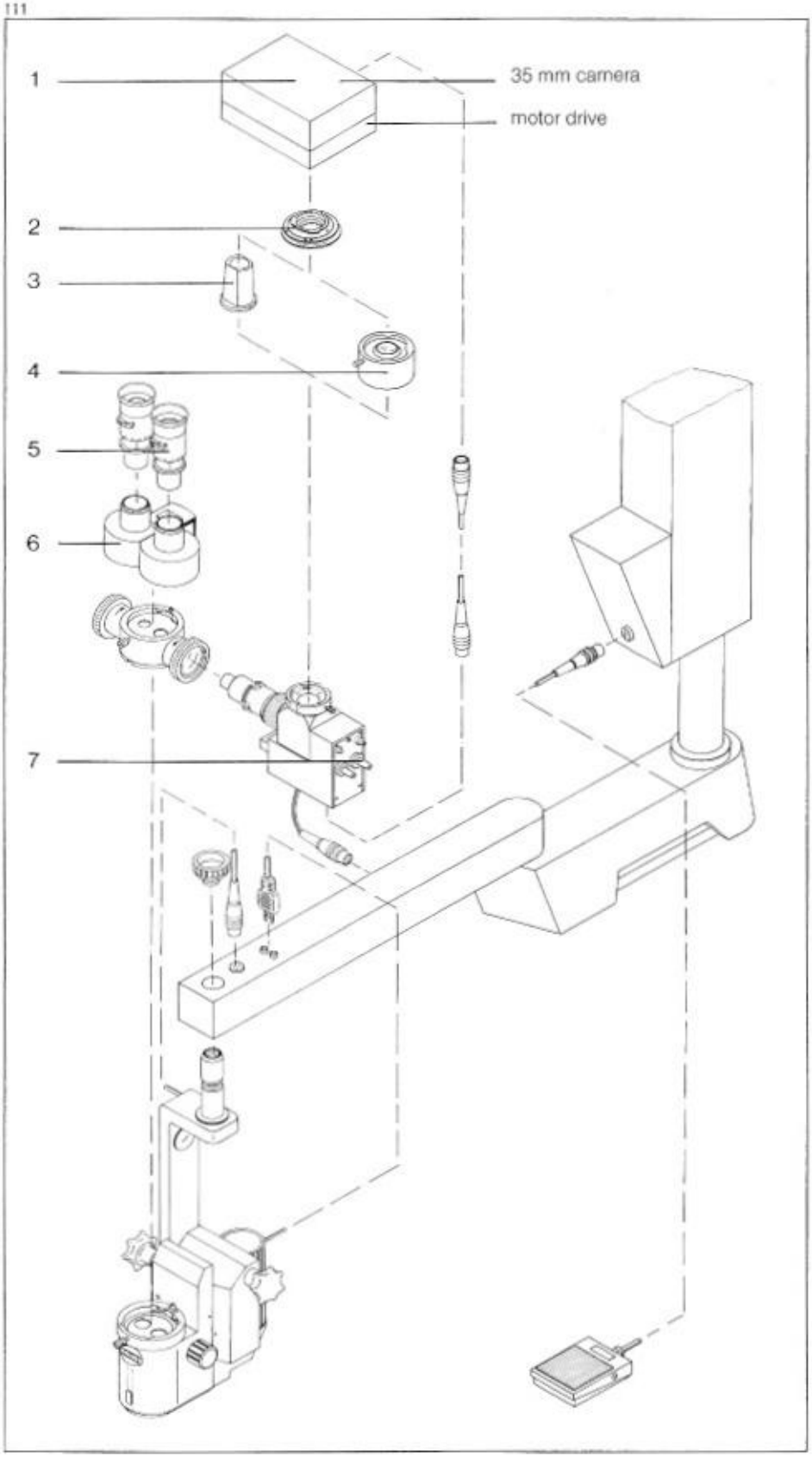
- Diaphragm ring (1) indicates the automatically set f-number. Manual operation is also possible.
- A photodiode incorporated in the photoadapter automatically sets the f-number.
- Connect cable (4) to stand/mount used (Contraves stand/ceiling mount or electromotive ceiling mount).
- Jack (5) takes cable for connection with the camera.
- When stepping on twin foot switch of the stand the microscope illumination switches to overload. Thereafter the diaphragm is actuated, the camera released and the next frame automatically fed into the camera by motorized film transport.
  Cat. No. 30 16 32

The photographic adapter can be combined as follows:



*The Nikon 35 mm camera and its motor drive are only available in special camera shops.

111



Hints for using the 35 mm camera on the photographic adapter with automatic diaphragm setting and delayed release
(Power supply by electrical assembly group of stand/mount).

When using a 35 mm camera (1) each camera requires a special intermediate piece (2).

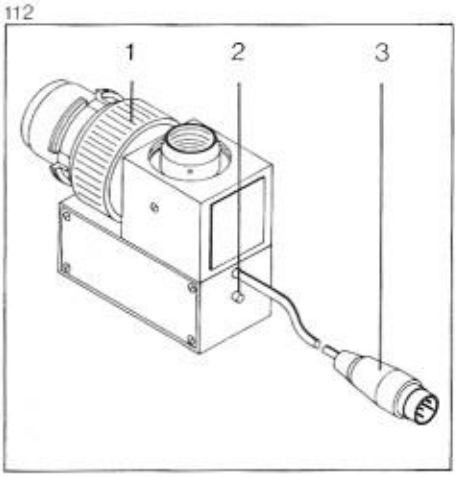
Auxiliary objectives (4) with 1.6 or 2.0 magnification can be mounted between photographic adapter and intermediate piece.

When using magnification attachment 1.6x always set half the ASA value of the film used on the inner black scale (7).

30° funnel stop (3) *(30 15 64)* is required when not using an auxiliary objetive, which gives a clearly defined image diameter of 22.5 mm.

Adapt eyepiece (5) with crossline and format limitation on the camera side of straight or inclined binocular tube (6). Since crossline and film planes are conjugated, the image is focused through the eyepiece.

112

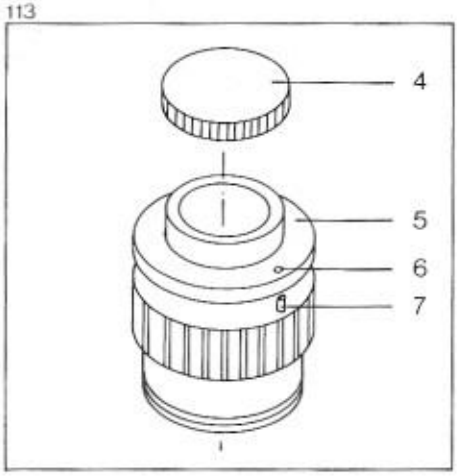


Cine adapter with automatic diaphragm setting
Diaphragm ring (1) indicates the automatically set f-number. Manual operation is also possible if need be (battery too low).

Pressing button (2) opens diaphragm of the cine adapter to check focusing.

Cable (3) connects the cine adapter to cine camera. To this end the Beaulieu cameras have a special outlet for diaphragm operation.

113

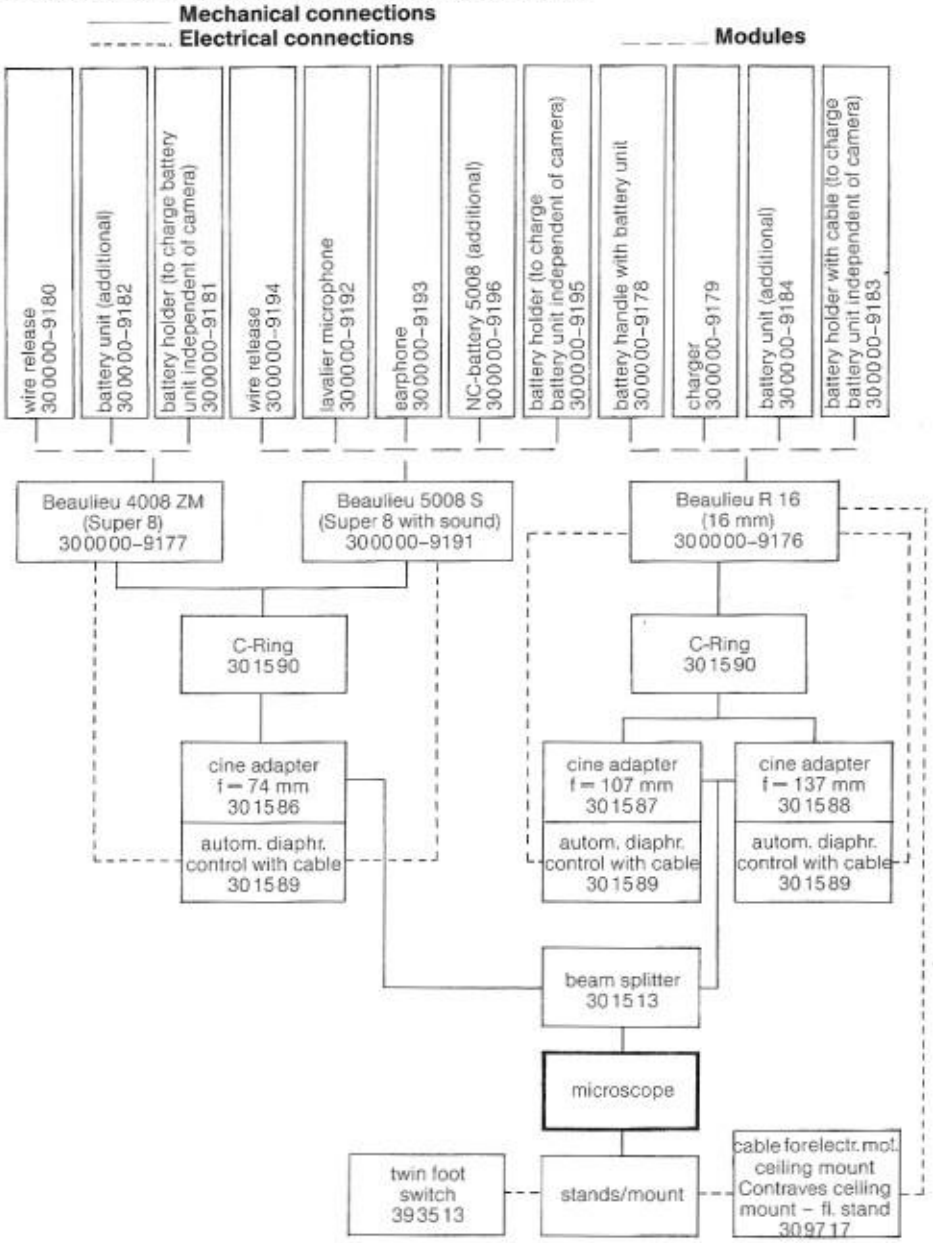


Connecting ring with standard C-thread
This ring (5) connects the camera to the cine adapter.

Cover (4) protects the thread. Remove before using connecting piece.

When screwing in the connecting piece insert cylindrical pins (7) into holes (6) for subsequent tightening.
Cat. No. 301590

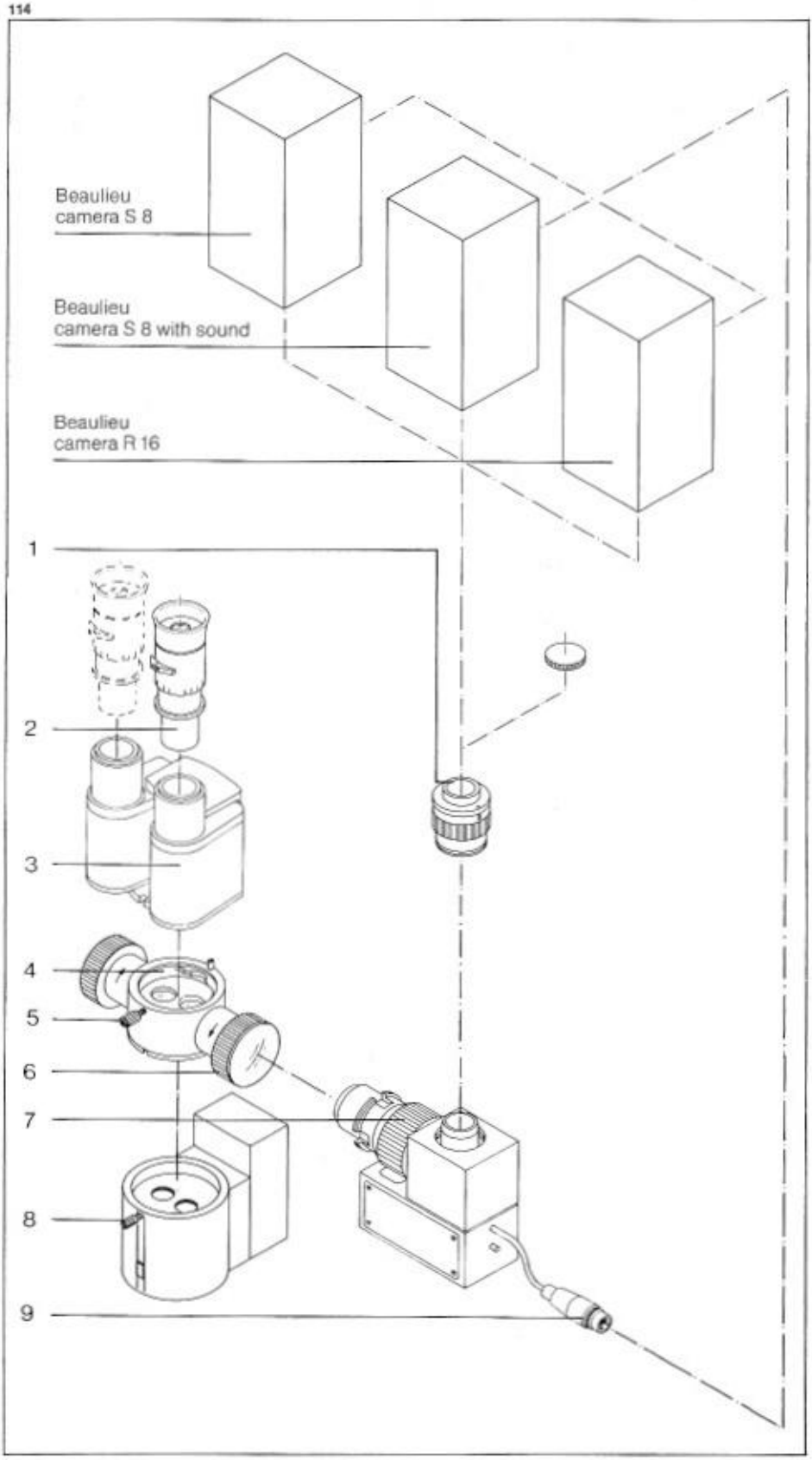
For cine work the instruments can be combined as follows:


Mechanical connections
Electrical connections
Modules
wire release 300000-9180
battery unit (additional) 300000-9182
battery holder (to charge battery unit independent of camera) 300000-9181
wire release 300000-9194
lavalier microphone 300000-9192
earphone 300000-9193
NC-battery 5008 (additional) 300000-9196
battery holder (to charge battery unit independent of camera) 300000-9195
battery handle with battery unit 300000-9178
charger 300000-9179
battery unit (additional) 300000-9184
battery holder with cable (to charge battery unit independent of camera) 300000-9183
Beaulieu 4008 ZM (Super 8) 300000-9177
Beaulieu 5008 S (Super 8 with sound) 300000-9191
Beaulieu R 16 (16 mm) 300000-9176
C-Ring 301590
C-Ring 301590
cine adapter f = 74 mm 301586
autom. diaphr. control with cable 301589
cine adapter f = 107 mm 301587
autom. diaphr. control with cable 301589
cine adapter f = 137 mm 301588
autom. diaphr. control with cable 301589
beam splitter 301513
microscope
twin foot switch 393513
stands/mount
cable forelectr.mot. ceiling mount Contraves ceiling mount – fl. stand 309717

Cine adapter f = 107 mm with automatic diaphragm setting is used for large objects.

Cine adapter f = 137 mm with automatic diaphragm setting is used for small objects and higher magnifications.

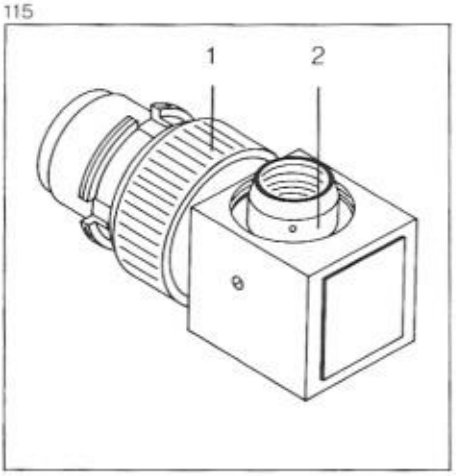
114


Beaulieu
camera S 8
Beaulieu
camera S 8 with sound
Beaulieu
camera R 16
1
2
3
4
5
6
7
8
9

Mounting of Beaulieu camera on cine adapter with automatic diaphragm setting

- Place beam splitter (4) on microscope and lock with screw (8).
- Introduce cine adapter (7) into beam splitter and lock by rotating ring (6) in arrow direction.
- Screw connecting piece (1) into camera. The connecting piece can also be used as a wrench (for subsequent tightening) by the pins engaging in the holes.
- Screw cine camera onto cine adapter. The connecting piece can be rotated until camera has position desired.
- **Note:** Once the camera has been fixed and tightened, it must not be rotated any more. Should adjustment become necessary, first release connecting piece of cine adapter.
- Place straight or inclined binocular tube (3) on beam splitter and fasten with screw (5).
- Adapt eyepiece (2) with crossline and format limitation to camera side of binocular tube. Since crossline and film planes are conjugated, the film image is focused through the eyepiece.
- Connect cable (9) with Beaulieu camera. Power supply of Beaulieu camera R 16 from electromotive ceiling mount or Contraves floor stand/ceiling mount is via cable *309717*.

115



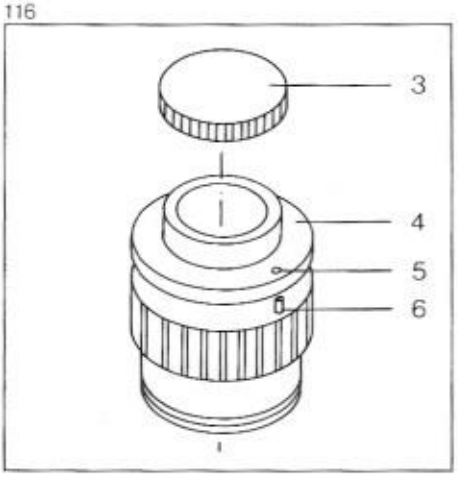
137 mm cine adapter for TV cameras
Diaphragm ring (1) is for manual adjustment of the diaphragm.

Slip connecting ring with standard C-thread over guide (2) and tighten.

Cameras with bayonet mounts require the connecting ring to be delivered by the manufacturer.

TV cameras of different brands can be used. They should, however, not exceed 3 kg in weight.
Cat. No. 301588

116

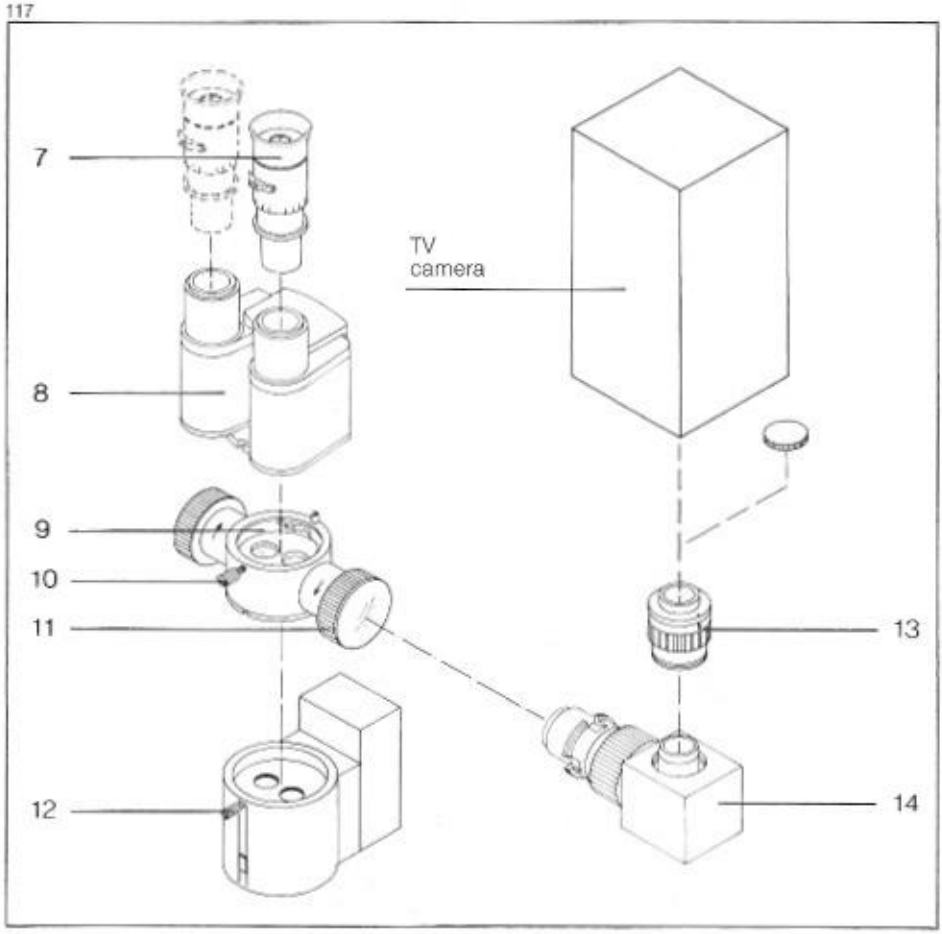


Connecting ring with standard C-thread
Connecting ring (4) attaches the camera to the cine adapter.

Cover (3) protects the thread. Remove before use.

Introduce cylindrical pins (6) into holes (5) when screwing the ring in. Thus it can also be used as tightening wrench.
Cat. No. 301590

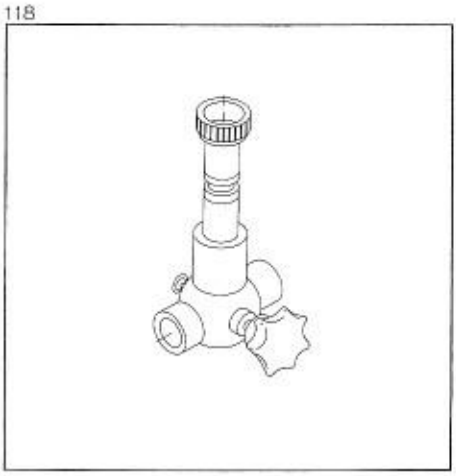
117



Mounting of TV camera on cine adapter

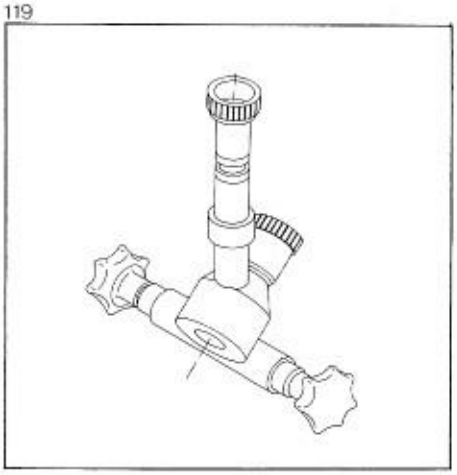
- Place beam splitter (9) on microscope and fasten with screw (12).
- Introduce cine adapter (14) into beam splitter and fix by rotating ring (11) in arrow direction.
- Screw connecting ring (13) to camera. With pins introduced into holes, the connecting ring can also be used as a wrench (for subsequent tightening).
- Screw TV camera onto cine adapter. The connecting ring can be rotated until camera has position desired.
- **Note:** Once the camera has been fixed and tightened, it must not be rotated any more. Should adjustment become necessary, first release connecting ring of cine adapter.
- Place straight or inclined binocular tube (8) on beam splitter and fasten with screw (10).
- Adapt eyepiece (7) with crossline and format limitation on camera side of binocular tube. Since crossline and film planes are conjugated, the image is focused through the eyepiece.

118



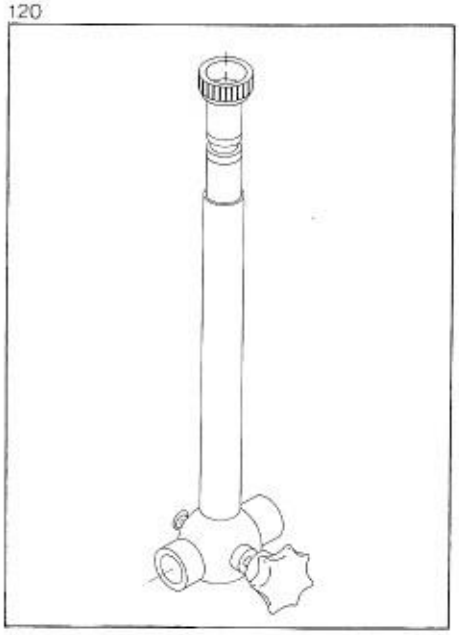
Coupling K 90/60 *Cat. No. 305253*

119



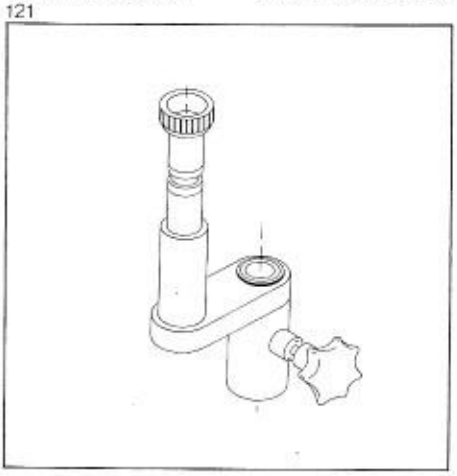
Coupling K 120/76 with
gear mechanism *Cat. No. 305336*

120



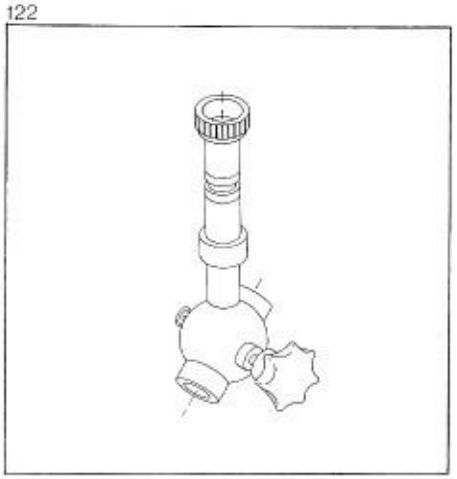
Coupling K 90/260 *Cat. No. 305252*

121

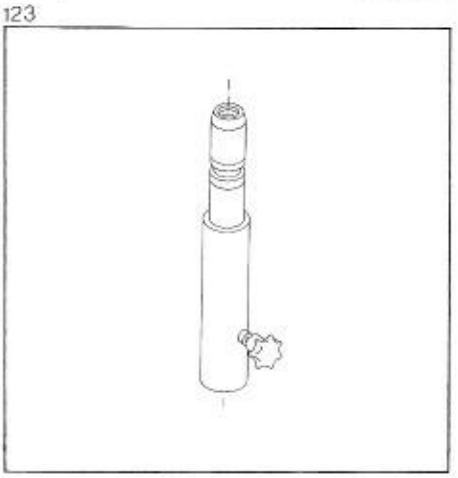


Coupling K 0/120 parallel
for Opmi 6 H *Cat. No. 303411*
for Opmi 1 H *Cat. No. 305252*

122



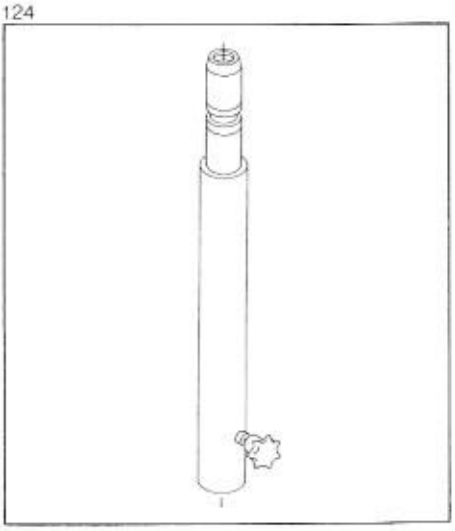
123



Coupling K 0/120 *Cat. No. 305256*

Coupling K 120/76 *Cat. No. 305254*

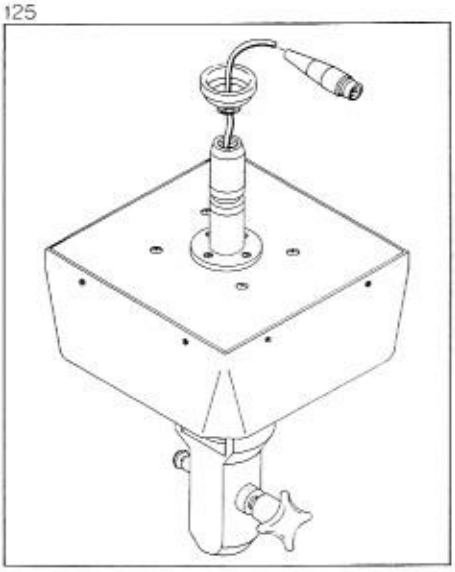
124



Coupling K 0/235 *Cat. No. 305251*

The couplings shown are for attaching extensions, expanding working angles and giving other working possibilities required.

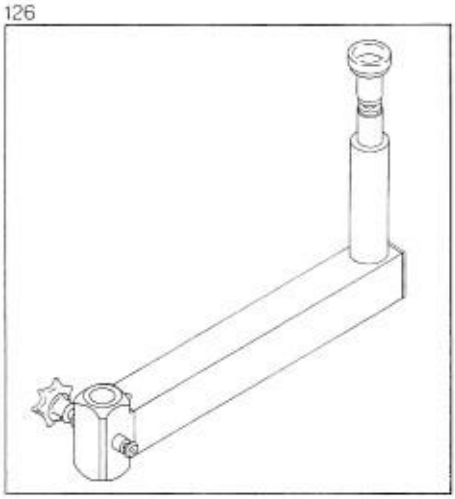
125



X-y coupling *Cat. No. 305335*

X-y coupling:
When using the x-y coupling a hand or pedal switch with 12 functions or the operating chair is required.

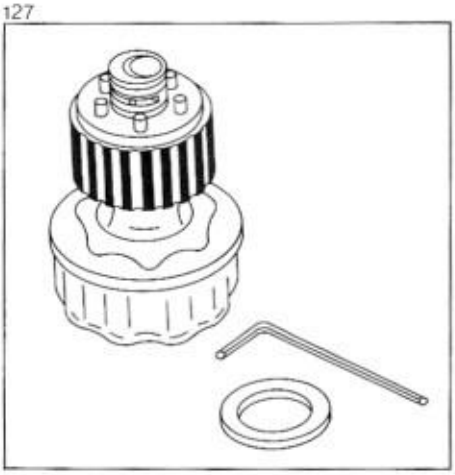
126



Height compensator arm *Cat. No. 305449*

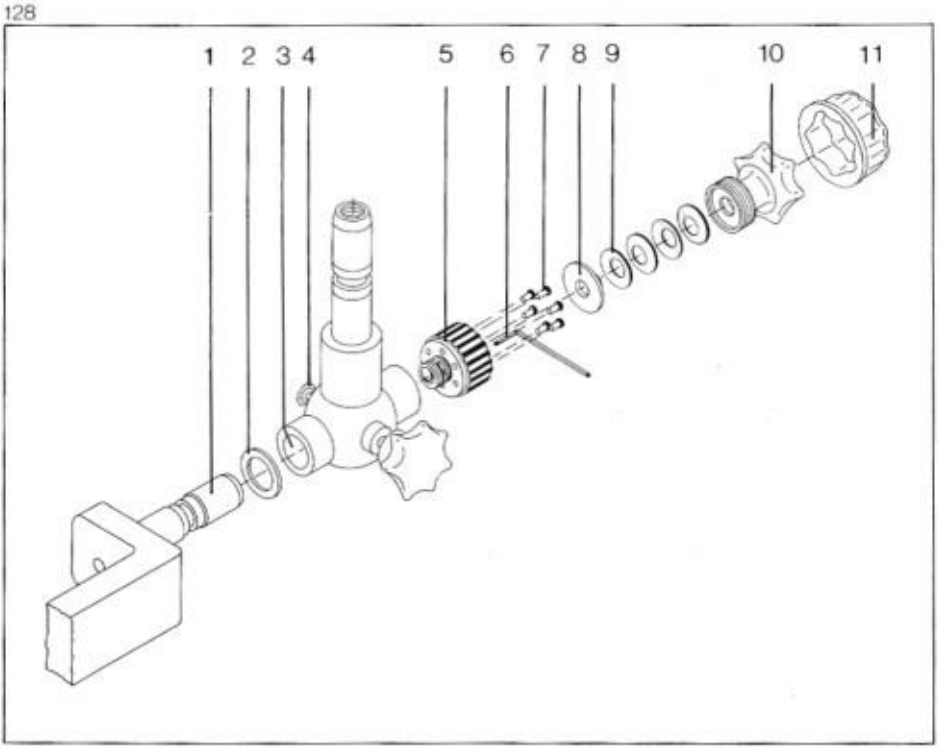
Height compensator arm
It can be adapted to electromotive ceiling mount and motorized stand upper part *305491* and *305394*.
The height compensator arm can be used from both sides, i.e., adaptation to stand arm is possible from below or above.

127



Coupling brake
The coupling brake prevents tilting of the microscope when unevenly loaded with accessories such as photographic equipment, observer tubes, etc.
Cat. No. 305345

128



Mounting the coupling brake

With the brake installed, smoothness of motion of the microscope pivot (1) in opening (3) of the coupling is adjusted with star knob (10).

Mount as follows:

Slide Teflon washer (2) on microscope pivot (1) and insert both in opening (3). Catch (4) must engage in groove of microscope pivot.

Insert and tighten screw (5) in the microscope pivot leaving an axial play of approx. 0.2 mm.

Use Allen wrench (6) to tighten Allen head screw of screw (5) so that screw (5) no longer moves.

Insert six pressure bolts (7) into holes of screw (5) and bring pressure plate (8) into place.

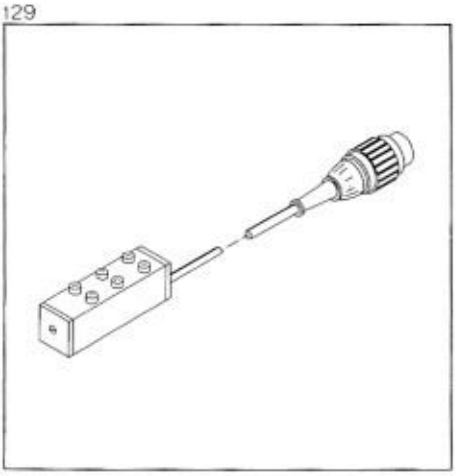
Insert plate spring (9) with its outer rim touching the pressure plate. The subsequent plate springs are inserted inversely against each other.

Screw star knob (10) into screw (5). The coupling brake action can be varied by tightening or releasing the star knob.

Finally slide sterilizable rubber cap (11) over star knob.

Note:
We recommend coupling K 120/76 with gear mechanism *(30 53 36)* when the microscope is to carry a heavy uneven load.

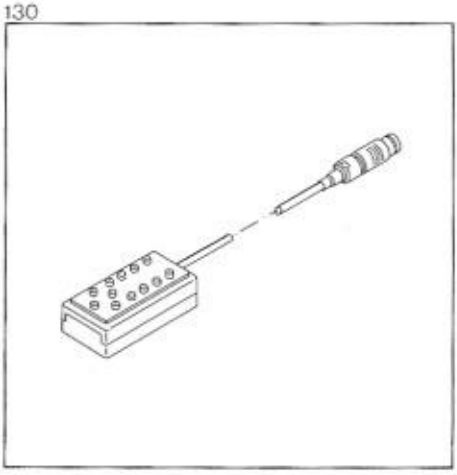
129



Hand or foot controls with different functions are required for operating the operation microscope and its accessories. One control panel can perform 1 to 12 different operations.

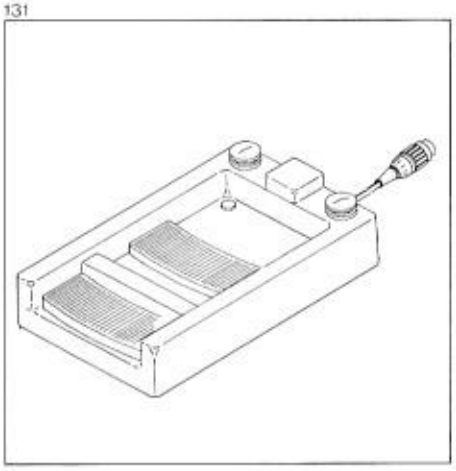
Manual control panel with 6 functions
Cat. No. 309984
The functions of the different push-buttons are printed on the panel.

130



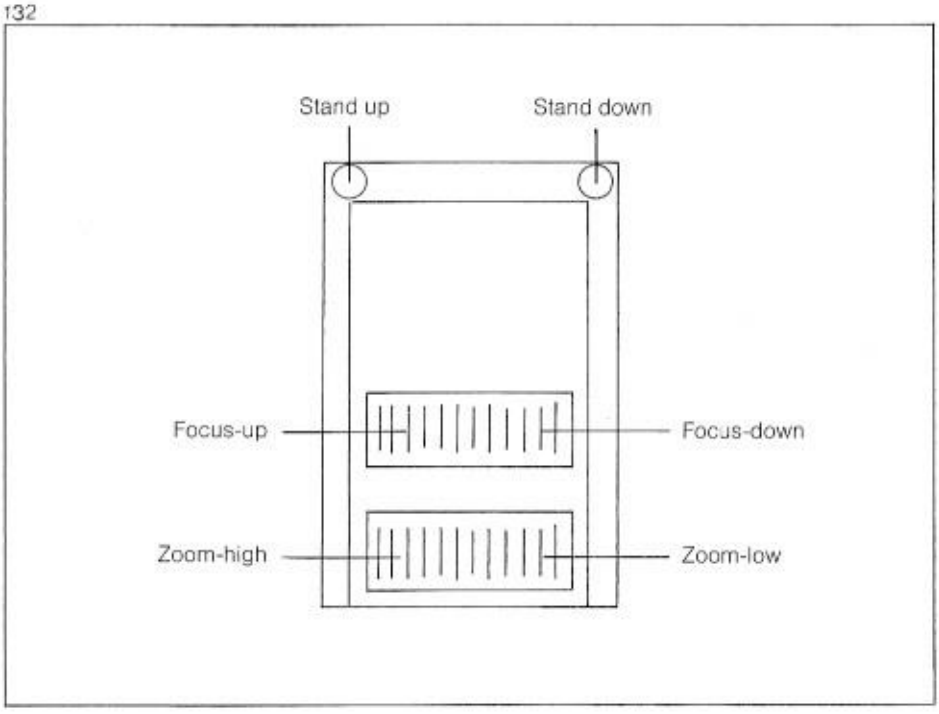
Manual control panel with 12 functions:
Cat. No. 309503
The functions of the different push-buttons are printed on the panel.

131

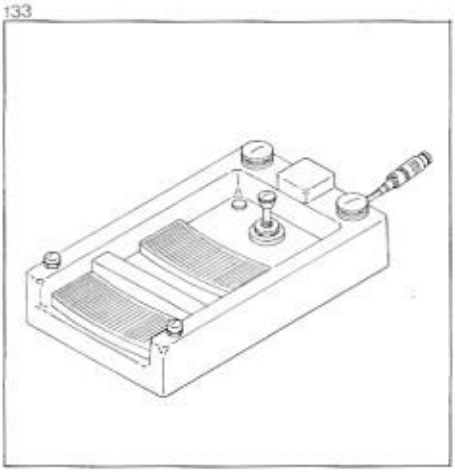


Pedal switch with 6 functions
Cat. No. 309591
The functions of the pedal switch are illustrated in Fig. 132.

132

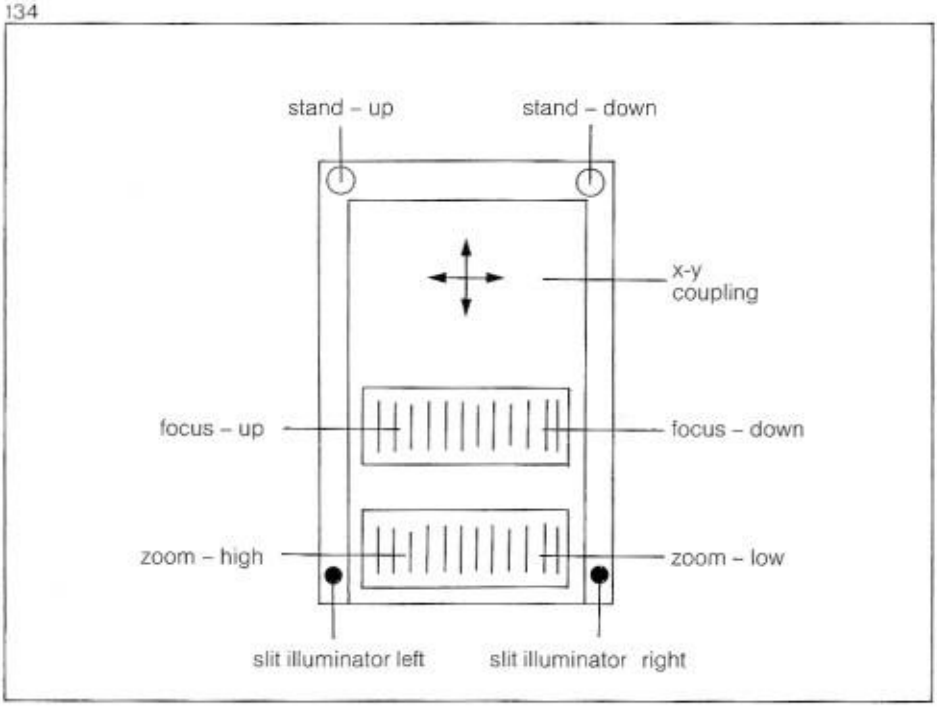


133

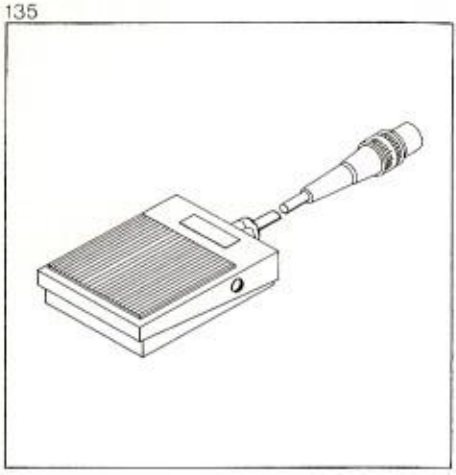


Pedal switch with 12 functions
Cat. No. 309599
The functions of the pedal switch are illustrated by Fig. 134.

134



135



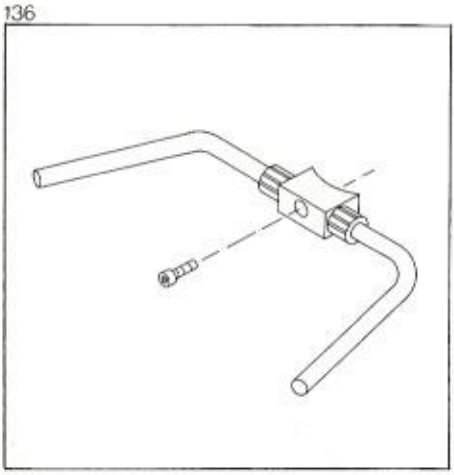
Combined pedal switch
The pedal switch has two points of contact. One switches the filament lamps to overload operation in order to generate a color temperature of approximately 3,200° K required for artificial light films.

The other additionally releases the camera.

Combined pedal switch for electromotive ceiling mount
Cat. No. 39 35 13

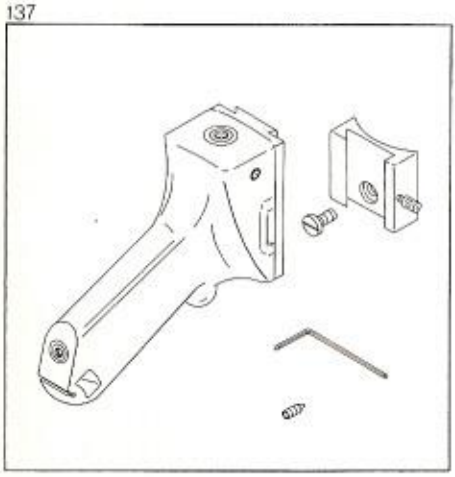
Combined pedal switch for overload operation of the Universal stand
Cat. No. 39 35 02

136



Microscope handle bar
The handle bar can be attached to all microscopes of cylindrical design. The handles should have sterilizable rubber caps *(30 58 08)* which gives sterile working conditions and greater maneuverability.
Cat. No. 30 34 48

137



Handle:
The handle can be adapted to all microscopes. Microscopes equipped with dovetail mount (older versions) do not require an intermediate piece.
Cat. No. 30 34 47

Annex

Total magnifications and object fields
(objectives f_1 = 50 mm to 2,000 mm, tube f_2 = 125 mm)

Objective f_1 =	Eye-pieces	Approx. dia of illuminated field	Magnification changer set to 0.4	0.6	1.0	1.6	2.5
			Total magnification / approx. dia. of object field				
50 mm	10x	8	**10.0** 20.0	**15.5** 13.0	**25.0** 8.0	**40.0** 5.0	**64.0** 3.1
	12.5x		**12.5** 16.0	**20.0** 16.0	**32.0** 6.4	**52.0** 4.0	**82.0** 2.5
	16x		**15.5** 12.5	**25.0** 8.0	**40.0** 5.0	**64.0** 3.1	**100.0** 2.0
	20x		**20.0** 9.5	**31.0** 6.2	**50.0** 3.8	**82.0** 2.4	**130.0** 1.5
100 mm	10x	16	**5.0** 40.0	**8.0** 26.0	**12.5** 16.0	**20.0** 10.0	**32.0** 6.2
	12.5x		**6.2** 33.0	**10.0** 21.0	**16.0** 13.0	**25.0** 8.0	**40.0** 5.0
	16x		**8.0** 25.0	**12.5** 16.0	**20.0** 10.0	**32.0** 6.2	**50.0** 4.0
	20x		**10.0** 19.0	**15.5** 12.5	**25.0** 7.6	**40.0** 4.8	**64.0** 3.0
125 mm	10x	20	**4.0** 52.0	**6.2** 32.0	**10.0** 20.0	**16.0** 12.5	**25.0** 7.8
	12.5x		**5.0** 42.0	**7.8** 26.0	**12.5** 16.0	**20.0** 10.0	**32.0** 6.4
	16x		**6.2** 32.0	**10.0** 20.0	**16.0** 12.5	**26.0** 7.8	**40.0** 5.0
	20x		**7.8** 24.0	**12.5** 15.5	**20.0** 9.5	**32.0** 6.0	**50.0** 3.8
150 mm	10x	24	**3.2** 60.0	**5.2** 38.0	**8.5** 24.0	**13.5** 15.0	**21.0** 9.5
	12.5x		**4.2** 50.0	**6.5** 32.0	**10.5** 19.0	**17.0** 12.0	**27.0** 7.6
	16x		**5.2** 38.0	**8.2** 24.0	**13.5** 15.0	**21.0** 9.5	**34.0** 5.8
	20x		**6.6** 29.0	**10.5** 18.0	**16.5** 12.0	**27.0** 7.2	**42.0** 4.4
175 mm	10x	28	**2.8** 72.0	**4.4** 46.0	**7.2** 28.0	**11.5** 17.0	**18.0** 11.0
	12.5x		**3.6** 58.0	**5.6** 36.0	**9.0** 23.0	**14.5** 14.0	**23.0** 9.0
	16x		**4.4** 44.0	**7.0** 28.0	**11.5** 18.0	**18.0** 11.0	**29.0** 6.8
	20x		**5.6** 34.0	**9.0** 22.0	**14.5** 13.5	**23.0** 8.5	**36.0** 5.2
200 mm	10x	32	**2.4** 82.0	**3.8** 52.0	**6.2** 32.0	**10.0** 20.0	**16.0** 12.5
	12.5x		**3.1** 66.0	**4.8** 42.0	**7.8** 26.0	**12.5** 16.0	**20.0** 10.0
	16x		**3.8** 52.0	**6.2** 32.0	**10.0** 20.0	**16.0** 12.5	**25.0** 7.8
	20x		**4.8** 40.0	**7.8** 25.0	**12.5** 15.5	**20.0** 9.5	**32.0** 6.0
225 mm	10x	36	**2.2** 90.0	**3.4** 58.0	**5.6** 36.0	**9.0** 22.0	**14.0** 14.0
	12.5x		**2.8** 74.0	**4.4** 46.0	**7.0** 29.0	**11.5** 18.0	**18.0** 11.5
	16x		**3.4** 58.0	**5.6** 36.0	**9.0** 22.0	**14.5** 14.0	**23.0** 9.0
	20x		**4.4** 44.0	**7.0** 28.0	**11.0** 17.0	**18.0** 10.5	**28.0** 6.8
250 mm	10x	40	**1.9** 100.0	**3.1** 64.0	**5.0** 40.0	**8.0** 25.0	**13.0** 15.5
	12.5x		**2.5** 82.0	**4.0** 52.0	**6.4** 32.0	**10.0** 20.0	**16.0** 12.5
	16x		**3.1** 64.0	**5.0** 40.0	**8.0** 25.0	**13.0** 15.5	**20.0** 10.0
	20x		**4.0** 48.0	**6.2** 31.0	**10.0** 19.0	**16.0** 12.0	**25.0** 7.6
275 mm	10x	44	**1.9** 115.0	**3.1** 72.0	**5.0** 44.0	**8.0** 28.0	**13.0** 17.0
	12.5x		**2.5** 90.0	**4.0** 58.0	**6.4** 36.0	**10.0** 22.0	**16.0** 14.0
	16x		**3.1** 70.0	**5.0** 44.0	**8.0** 28.0	**13.0** 17.0	**20.0** 11.0
	20x		**4.0** 54.0	**6.2** 34.0	**10.0** 21.0	**16.0** 13.0	**25.0** 8.5
300 mm	12.5x	48	**2.5** 100.0	**4.0** 62.0	**6.4** 38.0	**10.0** 24.0	**16.0** 15.0
	16x		**3.1** 76.0	**5.0** 48.0	**8.0** 30.0	**13.0** 19.0	**20.0** 12.0
	20x		**4.0** 58.0	**6.2** 36.0	**10.0** 23.0	**16.0** 14.5	**25.0** 9.0
320 mm	12.5x	51	**2.5** 105.0	**4.0** 66.0	**6.4** 40.0	**10.0** 25.0	**16.0** 16.0
	16x		**3.1** 82.0	**5.0** 52.0	**8.0** 32.0	**13.0** 20.0	**20.0** 12.5
	20x		**4.0** 62.0	**6.2** 40.0	**10.0** 24.0	**16.0** 15.0	**25.0** 9.5

Total magnifications and object fields
(objectives f_1 = 50 mm to 2,000 mm, tube f_2 = 125 mm)

Objective f_1 =	Eye-pieces	Approx. dia. of illuminat-ed field	Magnification changer set to 0.4	0.6	1.0	1.6	2.5
			Total magnification / approx. dia. of object field				
350 mm	16x	56	**3.1** 90.0	**5.0** 56.0	**8.0** 34.0	**13.0** 22.0	**20.0** 13.5
	20x		**4.0** 68.0	**6.2** 442.0	**10.0** 27.0	**16.0** 16.5	**25.0** 10.5
375 mm	16x	60	**3.1** 95.0	**5.0** 60.0	**8.0** 38.0	**13.0** 23.0	**20.0** 14.5
	20x		**4.0** 46.0	**6.2** 46.0	**10.0** 29.0	**16.0** 18.0	**25.0** 11.5
400 mm	16x	64	**3.1** 100.0	**5.0** 64.0	**8.0** 40.0	**13.0** 25.0	**20.0** 15.5
	20x		**4.0** 78.0	**6.2** 50.0	**10.0** 31.0	**16.0** 19.0	**25.0** 12.0
500 mm	20x	80	**4.0** 100.0	**6.2** 62.0	**10.0** 38.0	**16.0** 24.0	**25.0** 15.0
800 mm	20x	128	**4.0** 155.0	**6.2** 100.0	**10.0** 62.0	**16.0** 38.0	**25.0** 24.0
1,250 mm	20x	200	**4.0** 240.0	**6.2** 155.0	**10.0** 95.0	**16.0** 60.0	**25.0** 38.0
2,000 mm	20x	320	**4.0** 380.0	**6.2** 240.0	**10.0** 150.0	**16.0** 95.0	**25.0** 60.0

The total magnification and object field size of the binocular tube f = 80 mm with eyepieces (30 37 77) correspond to the data of the binocular tube f = 125 mm with 12.5x eyepieces.

Total magnifications and object fields
(objectives f_1 = 50 mm to 2,000 mm, tube f_2 = 160 mm)

Objective f_1 =	Eye-pieces	Approx. dia. of illuminated field	Magnification changer set to 0.4	0.6	1.0	1.6	2.5
			Total magnification / approx. dia. of object field				
50 mm	10x	8	**12.5** 16.0	**20.0** 10.0	**32.0** 6.2	**52.0** 3.8	**82.0** 2.4
	12.5x		**16.0** 13.0	**25.0** 8.0	**40.0** 5.0	**66.0** 3.1	**105.0** 2.0
	16x		**20.0** 10.0	**32.0** 6.2	**52.0** 3.8	**82.0** 2.4	**130.0** 1.5
	20x		**25.0** 7.6	**40.0** 4.8	**64.0** 3.0	**105.0** 1.9	**165.0** 11.5
100 mm	10x			**10.0** 20.0	**16.0** 12.5	**26.0** 7.8	**40.0** 5.0
	12.5x		**7.8** 26.0	**12.5** 16.0	**20.0** 10.0	**32.0** 6.2	**52.0** 4.0
	16x		**10.0** 20.0	**16.0** 12.5	**25.0** 7.8	**40.0** 5.0	**64.0** 3.1
	20x		**12.5** 15.5	**20.0** 9.5	**32.0** 6.0	**52.0** 3.8	**82.0** 2.4
125 mm	10x	20	**5.0** 40.0	**8.0** 25.0	**12.5** 15.5	**20.0** 10.0	**32.0** 6.2
	12.5x		**6.2** 32.0	**10.0** 20.0	**16.0** 12.5	**26.0** 7.8	**40.0** 5.0
	16x		**8.0** 25.0	**12.5** 16.0	**20.0** 10.0	**32.0** 6.2	**52.0** 3.8
	20x		**10.0** 19.0	**16.0** 12.0	**25.0** 7.6	**40.0** 4.6	**64.0** 2.9
150 mm	10x	24	**4.2** 48.0	**6.6** 30.0	**10.5** 19.0	**17.0** 11.5	**27.0** 7.4
	12.5x		**5.2** 38.0	**8.2** 24.0	**13.5** 15.0	**22.0** 9.5	**34.0** 6.0
	16x		**6.6** 30.0	**10.5** 19.0	**17.0** 12.0	**27.0** 7.4	**44.0** 4.6
	20x		**8.2** 23.0	**13.0** 14.5	**21.0** 9.5	**34.0** 5.6	**54.0** 3.6
175 mm	10x	28	**3.6** 56.0	**5.6** 36.0	**9.0** 22.0	**14.5** 13.5	**23.0** 8.5
	12.5x		**4.4** 46.0	**7.2** 28.0	**11.5** 18.0	**18.0** 11.0	**29.0** 7.0
	16x		**5.6** 36.0	**9.0** 22.0	**14.5** 13.5	**23.0** 8.5	**36.0** 5.4
	20x		**7.2** 27.0	**11.5** 17.0	**18.0** 10.5	**29.0** 6.6	**46.0** 4.2
200 mm	10x	32	**3.1** 64.0	**5.0** 40.0	**8.0**225.0	**12.5** 15.5	**20.0** 10.0
	12.5x		**4.0** 52.0	**6.2** 33.0	**10.0** 20.0	**16.0** 12.5	**25.0** 8.0
	16x		**5.0** 40.0	**7.8** 25.0	**12.5** 16.0	**20.0** 10.0	**32.0** 6.2
	20x		**6.2** 31.0	**10.0** 19.0	**16.0** 12.0	**25.0** 7.6	**40.0** 4.8
225 mm	10x	36	**2.8** 72.0	**4.4** 76.0	**7.0** 28.0	**11.5** 17.0	**18.0** 11.0
	12.5x		**3.6** 58.0	**5.6** 36.0	**9.0** 23.0	**14.5**114.0	**23.0** 9.0
	16x		**4.4** 44.0	**7.0** 28.0	**11.5** 18.0	**18.0** 11.0	**29.0** 6.8
	20x		**5.6** 34.0	**9.0** 22.0	**14.0** 13.5	**23.0** 8.5	**36.0** 5.2
250 mm	10x	40	**2.5** 80.0	**4.0** 50.0	**6.4** 31.0	**10.0** 19.0	**16.5** 12.5
	12.5x		**3.2** 64.0	**5.0** 40.0	**8.0** 25.0	**13.0** 15.5	**20.0** 10.0
	16x		**4.0** 50.0	**6.4** 32.0	**10.0** 20.0	**16.5** 12.0	**26.0** 7.6
	20x		**5.0** 38.0	**8.0** 24.0	**13.0** 15.0	**21.0** 9.5	**33.0** 5.8
275 mm	10x	44	**2.5** 90.0	**4.0** 56.0	**6.4** 34.0	**10.0** 22.0	**16.5** 13.5
	12.5x		**3.2** 72.0	**5.0** 46.0	**8.0** 28.0	**13.0** 17.0	**20.0** 11.0
	16x		**4.0** 54.0	**6.4** 36.0	**10.0** 22.0	**16.5** 13.5	**26.0** 8.5
	20x		**5.0** 42.0	**8.0** 27.0	**13.0** 16.5	**21.0** 10.5	**33.0** 6.6
300 mm	12.5x	48	**3.2** 78.0	**5.0** 48.0	**8.0** 30.0	**13.0** 19.0	**20.0** 2.0
	16x		**4.0** 60.0	**6.4** 38.0	**10.0** 24.0	**16.5** 14.5	**26.0** 9.0
	20x		**5.0** 46.0	**8.0** 29.0	**13.0** 18.0	**21.0** 11.0	**33.0** 7.0
320 mm	12.5x	51	**3.2** 82.0	**5.0** 52.0	**8.0** 32.0	**13.0** 20.0	**20.0** 12.5
	16x		**4.0** 64.0	**6.4** 40.0	**10.0** 25.0	**16.5** 15.5	**26.0** 10.0
	20x		**5.0** 48.0	**8.0** 31.0	**13.0** 19.0	**21.0** 12.0	**33.0** 7.6

Total magnifications and object fields
(objectives f_1 = 50 mm to 2,000 mm, tube f_2 = 160 mm)

Objective f_1 =	Eye-pieces	Approx. dia. of illuminated field	Magnification changer set to 0.4	0.6	1.0	1.6	2.5
			Total magnification / approx. dia. of object field				
350 mm	16x	56	**4.0** 70.0	**6.4** 44.0	**10.0** 27.0	**16.5** 17.0	**26.0** 10.5
	20x		**5.0** 54.0	**8.0** 34.0	**13.0** 21.0	**21.0** 13.0	**33.0** 8.2
375 mm	16x	660	**4.0** 76.0	**6.4** 48.0	**10.0** 30.0	**16.5** 18.0	**26.0** 11.5
	20x		**5.0** 58.0	**8.0** 36.0	**13.0** 23.0	**21.0** 14.0	**33.0** 9.0
400 mm	16x	64	**4.0** 80.0	**6.4** 50.0	**10.0** 31.0	**16.5** 20.0	**26.0** 12.5
	20x		**5.0** 62.0	**8.0** 38.0	**13.0** 24.0	**21.0** 15.0	**33.0** 9.5
500 mm	20x	80	**5.0** 76.0	**8.0** 48.0	**13.0** 30.0	**21.0** 19.0	**33.0** 12.0
800 mm	20x	128	**5.0** 125.0	**8.0** 78.0	**13.0** 48.0	**21.0** 30.0	**33.0** 19.0
1,250 mm	20x	200	**5.0** 190.0	**8.0** 120.0	**13.0** 76.0	**21.0** 46.0	**33.0** 29.0
2,000 mm	20x	320	**5.0** 300.0	**8.0** 190.0	**13.0** 120.0	**21.0** 74.0	**33.0** 48.0

With the required modular systems mounted, operation of the microscope is as follows:

- Adjust binocular tube to interpupillary distance and set user's refractive error on the diopter scale (more details on pp. 70 and 72).
- Move the focusing drive to the middle of its range and align the microscope by shifting the microscope carrier until the illuminated field appears sharply defined on the object.
- With the focusing drive focus object plane under maximum magnification to avoid refocusing when switching to other magnifications.

To protect the microscope from dust, always cover it when not in use.

Keep objectives, eyepieces, tubes, etc. in dust-free cases.

Usually only the outer surface of objectives and eyepieces are cleaned. Use an air blower or a grease-free brush for removing dust particles. Fingerprints and similar marks can be removed by a cotton wad wrapped around a wooden stick and slightly moistened with acetone.

Only clean enameled surface with a clean, soft brush or cloth.
If necessary, use a little naphta.
Do **not** use acetone or ether!!

Sterilization Methods

Gas (ETO) Sterilization*

Standard ETO is acceptable for use with Kraton* thermoplastic rubber based compounds. The ETO gas will penetrate the Kraton, plasticize it and relieve molded in stresses or imposed stresses on the part.

Aeration time is greatly dependent on the size of the master carton and its permeability. One week is the minimum requirement to bring the ETO residuals below 1 PPM, as tested by the standard liquid extraction method. If the product is heated to 125-135 F in an aeration chamber with high airflow, the time can be accelerated to as little as four days.

Gamma Sterilization*

Kraton thermoplastic rubber can be sterilized using gamma radiation without suffering a large loss in physical properties even after extended storage.

Kraton G-2705 rubber was exposed to Cobalt 60 radiation doses of 3, 6, and 12 Mrads. The table below shows the effect of the radiation on the tensile properties of the material after being aged for 21 months:

Property	Original	0 Mrads	3 Mrads	6 Mrads	12 Mrads
Hardness, Shore A	55	50	48	48	43
Tensile Strength, psi	1200	+8%	+12%	-3%	-15%
300% Modulus, psi	350	+3%	-4%	-10%	-15%
Elongation, %	700	+3%	+10%	+8%	+12%

Steam Sterilization*

GLS Corporation can suggest the following maximum autoclave cycles for selected materials**

250 F for 17 minutes

240 F for 27 minutes.

There will be some slippage or creep with any Kraton thermoplastic rubber based products at these temperatures because of the relieving of molded in stress and the relaxation of imposed stresses. To minimize these effects, parts should be molded at the suggested processing conditions, and not autoclaved while being subjected to outside mechanical stresses.

* Information pertains only to Kraton G-based compounds
** Information pertains only to Kraton G-2705 compound.

Disposables

Spare Bulbs

Endure Number		
90-1200	Zeiss 6V 30W Bt58Z	390158
90-1201	Zeiss 6V 50W Bt86Z	390186
90-1202	Zeiss 12V 100W HLX #64626	380075 1020
90-1203	EFR Housing #900	
90-1204	Zeiss 15V 150W EFR	310198
90-1205	Zeiss 12V 100W HLX #64627	380079 9040
90-1206	Zeiss Superlux 40	
90-1207	Zeiss Superlux 175	
90-1208	Zeiss Superlux 300 with Cartridge	
90-1209	Zeiss Superlux 300 Bulb Only - No Housing or Meter	
90-1302	ELS 150 21V 150W EKE	
90-1400	ELS 250 24V 250W ELC	
90-1403	ELS 24 60V 24W Metal Halide	
90-1402	ILO 300W with Cartridge	

Sterilizable Knob Covers

91-0100	Zeiss Knob Cover, MD Zoom	302602 0203
91-0101	Zeiss Knob Cover, 0-60 PD Adjustment	303418 0000
91-0102	Zeiss Knob Cover, Small, 0-180 PD Adjustment	305810 0000
91-0103	Zeiss Knob Cover, Medium,	305807 0000
91-0104	Zeiss Knob Cover, Magnification Changer	303673 0000
91-0105	Zeiss Knob Cover, Large	305803 0000
91-0106	Zeiss Knob Cover, Extra Large	303674 0000
91-0110	Zeiss Handle Cover, CS/MD Short	302501 9060
91-0111	Zeiss Handle Cover, CS/MD Long	302627 9001
91-0112	Zeiss Handle Cover, F-Cover	305808 0000
91-0113	Zeiss Handle Cover, Pro Magis	
91-0114	Zeiss Hande Cover for MDU Post	305809 0000

Dust Covers

92-0010	Dust Cover, Large

Foot Control Covers

92-0200	Endure Poncho Disposable Foot Control Cover, 20 per Case

Drapes

93-8222	Sterile Drape, 50/180cm, 20/70", Zeiss 48mm, Zeiss OPMI 1/OPMI 6 w/o Side Observer, 20 per Case
93-8214	Sterile Drape, 115/180cm, 45/70", Zeiss 48mm, Zeiss OPMI 1/OPMI 6 w/Side Observer, 20 per Case
93-8296	Sterile Drape, 115/300cm, 45/118", Zeiss 65mm, MD/CS/11/111/ORL/Pro Magis/Neuro/ VISU 150/VISU 200, 20 per Case